DOCUMENT RESUME

ED 089 019 CE 001 058

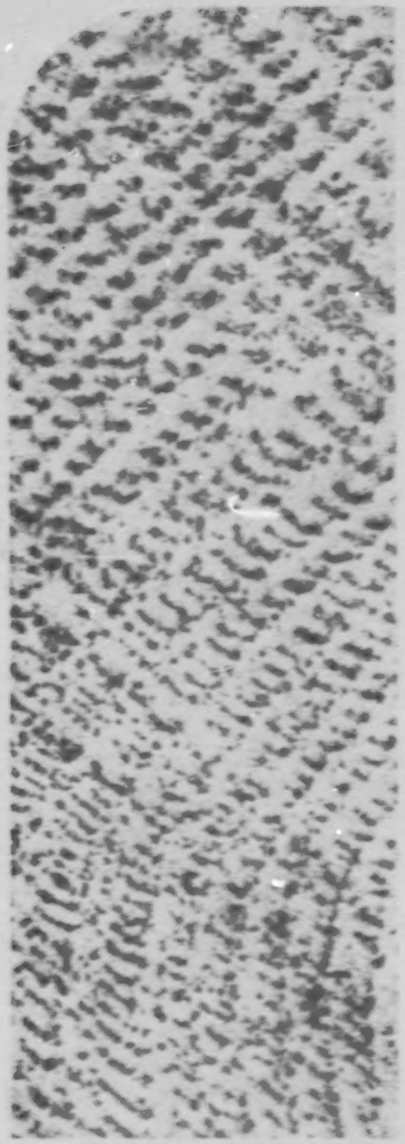
TITLE Millwork and Cabinetmaking: Apprentice-Related Training, Instructor's Manual. First, Second, Third, and Fourth Years of a Four-Year Series, in Four Volumes.
INSTITUTION Washington State Coordinating Council for Occupational Education, Olympia.
REPORT NO P-71-61
PUB DATE May 71
NOTE 370p.

EDRS PRICE MF-$0.75 HC-$17.40 PLUS POSTAGE
DESCRIPTORS Apprenticeships; *Cabinetmaking; Carpenters; *Curriculum Guides; Industrial Arts; *Instructional Materials; Trade and Industrial Education; Woodworking
IDENTIFIERS Washington

ABSTRACT

The four volumes are updated apprentice-related instruction materials in a four-year related instruction curriculum. Lessons are outlined under topic and unit headings. Each lesson lists lesson objective, study assignment, important study factors, references, work assignment, and introduction to next lesson. Tests are included. Information sheets are presented, often with numerous illustrative figures. (SC)

ED 089019



MILLWORK AND CABINETMAKING

APPRENTICE-RELATED TRAINING

INSTRUCTOR'S MANUAL

1

FIRST YEAR OF A
4-YEAR SERIES

VOCATIONAL EDUCATION
COORDINATING
COUNCIL FOR
OCCUPATIONAL
EDUCATION
P. O. BOX 248
OLYMPIA, WASHINGTON
98501

U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

CE 001 058

MAY, 1971
P 71-61

FOREWORD

The Washington State Coordinating Council for Occupational Education, Trade and Industrial Section, is one of the agencies responsible for encouraging the development and promotion of the apprentice training program in this state and, under existing state law, is responsible in cooperation with local schools for providing technical and related instruction for all registered apprentices.

This course of related study in the Millwork and Cabinetmaking trade is designed to meet the need for organized study in the various technical aspects necessary for an apprentice to become a well-trained journeyman. The apprentice who works hard at learning his trade on-the-job, and who masters the related instructional material included in these lessons will master his trade and become a real asset to his trade and his community.

Ernest G. Kramer
Director and Executive Officer
Coordinating Council for Occupational
  Education

ACKNOWLEDGMENTS

The Washington State Coordinating Council for Occupational Education, Trade and Industrial Section, recognizes the valuable contribution made by the Revision Committee representing the Cabinet and Millmen trade in reviewing, revising, and updating the apprentice-related instruction material contained in this unit of the four-year related instruction curriculum.

The following members are actively engaged in the trade and each made a substantial contribution to the project:

NAME	PHONE	MAILING ADDRESS
Ronald E. Aasen	SK2-7891	1732 North Prospect, Tacoma, 98406
Paul Belts	822-1874	12243 N.E. 90th, Kirkland, 98033
Earle Bennett	653-2473	425 Second, Naches, 98937
Wes Binham	GR2-5401	3710 South K, Tacoma, 98408
Bob Buckingham	MU2-2920	2512 2nd Avenue, Seattle, 98121
Eugene Chose	743-6618	14104 Cascadian Way, Everett, 98201
Joe Drazba	WA2-8546	501 54th Ave., E., Tacoma, 98404
Orville Evanger	LA5-6961	8227 20th Ave., N.E., Seattle, 98115
Albert K. Hewitt	BR2-0404	401 E. 26th St., Tacoma, 98421
Edward J. Hill	MA7-7862	1322 Fawcett Ave., Tacoma, 98402
Orlo Hinman	MA3-2022	4809 Airport Way So., Seattle, 98108
Don Janus	SH6-8578	17802 W. Lake Sammamish Rd. S., Bellevue, 98004
Dick Johnson	LA3-4986	2334 N. 61st, Seattle, 98103
Leonard J. Liebelt	GR2-4476	3820 S. Pine St., Tacoma, 98411
Charles R. Lyon	BR2-4177	Industrial Conference Board, 610 Perkins Building, Tacoma, 98402
Donald L. May	RO2-3084	7503 14th Ave. S.W., Seattle, 98106
Cecil J. Young	WE5-1607	4044 37th Ave. S.W., Seattle, 98126

Special thanks are extended to Mr. Earle Bennett, Project Director, who kept all of us working to complete the project; to Mr. Steve Bishopp, Program Specialist, CCOE, who designed the covers and handled the printing arrangements; and to the T & I secretarial staff, who spent many hours in typing and other support work.

The CCOE, T & I Section, also acknowledges with appreciation the cooperation and support of the Washington State Apprenticeship Council, other States, and, in particular, the State of California.

Inquiries, comments, and questions may be directed to

Oliver K. "Hap" Schaer, Director
Trade, Industrial, and Technical Education Section
Washington State Coordinating Council for Occupational Education
P. O. Box 248
Olympia, Washington 98504

INTRODUCTION

The year 1970 was a busy one for the Revision Committee of the Millwork and Cabinetmaking Trade in its work in updating the curriculum and instructors' manual for apprenticeship related training.

Outmoded trade practices were omitted, new trade trends were included, and time adjustments were made to make the best practical use of the 144 hours per year of apprenticeship related training time.

New decimal page numbering is used to facilitate updating the manual in the future without the necessity of reprinting and renumbering the pages.

An example of the numbering is as follows:

Unit Number	Topic Number	Lesson Number	Page Number
03	.03	.11	.01

Hence, the above page number - 03.03.11.01 - will read:

Unit C - for Unit Number 03

Plywood and Veneers - for Topic Number .03

Lesson 11 of the first year - for Lesson Number .11

Page one of Lesson 11 - for Page Number .01

Note:

1. Lesson numbers for each year are 1 through 36.
2. Page numbers are for each lesson, 1 through the number of pages for that lesson.

CABINETMAKING AND MILLWORK

REFERENCE BOOKS:

	Price
Cabinet Making, American Technical Society, by Dahl and Wilson	7.15
Practical Math, by Hobbs, McKinney, and Dalzell	4.35
Principles of Woodworking, by Harth	
Carpenter Mathematics, United Brotherhood of Carpenters and Joiners	.80
California Cabinetmaking and Millwork Apprenticeship, Workbook 1, Revised 1962, Workbook 2, Revised 1964, and Workbook 3, Revised 1966	2.00 each
California Cabinetmaking and Millwork Apprenticeship Testbook 1, Revised 1962, Testbook 2, Revised 1964, and Testbook 3, Revised 1966	2.00 each
California Cabinetmaking and Millwork Apprenticeship Examination 1, Revised 1962, Examination 2, Revised 1964, and Examination 3, Revised 1966	.35 each

FILMS, FILM STRIPS AND OTHER VISUAL AIDS

To Instructors:

Many new visual aids are being developed so this list should be updated frequently. The instructor will check with his apprentice coordinator for additional information and how best to obtain the use of the following items.

A. Motion Picture Film--A.I.M.S., Inc.

1. Safety Demonstration on the Jointer Color 12 min.

   Clear, close-up photography of basic procedures with major emphasis on Safety Demonstration and Basic Operations. "Tight Shots" illustrate vividly the close-up detail of procedures otherwise potentially hazardous to demonstrate.

2. Safety Demonstration on the Radial Saw Color 12 min.

   Clear, close-up photography of basic procedures with major emphasis on Safety Demonstration and Basic Operations. "Tight Shots" illustrate vividly the close-up detail of procedures otherwise potentially hazardous to demonstrate.

3. Safety Demonstration on the Table Saw, Part I and

& 4. Part II Color 12 min. each

   Clear, close-up photography of basic procedures with major emphasis on Safety Demonstration and Basic Operations. "Tight Shots" illustrate vividly the close-up detail of procedures otherwise potentially hazardous to demonstrate.

5. Its Up to You B & W 13 min.

   Describes one man's fight against blindness after an eye accident due to carelessness on the job. Demonstrates an eye operation showing the magnetic extraction of a piece of metal from the eye. Explains how to avoid eye accidents by following safety rules.

B. Filmstrips--CORONET

Shop Safety:

1. Think Safety
2. General Shop Hazards
3. Hand Saws, Chisels, and Files
4. Screwdrivers, Wrenches, Sheet Metal, and Welding
5. Grinders, Routers, Power Saws, and Jointers
6. Drill Presses and Lathes

CABINETMAKING AND MILLWORK

UNIT A - TOPIC 1

The Apprentice and His Trade

LESSON OBJECTIVE:

Develop appreciation for the trade through history, opportunities, and future potentials. Learn importance of the apprenticeship system and how to take advantage of opportunities for life work. Ethics of trade.

STUDY ASSIGNMENT:

Introduction and how to study.
The apprenticeship system.
The scope of the cabinetmaker's trade.

IMPORTANT STUDY FACTORS:

Employee and employer relations
Introduce apprentice coordinator
J.A.C. function

REFERENCES:

California workbook, pp. 6 through 10, 17 through 21
Carpentry Unit 1, U.B.C. and J.A. pp. 145 through 150
"How to Study" by James McKinney
"Apprenticship," by R.L. Switzer
"Woodworking Technology," by Hammond, Donnelly, Harrod and Rayner

WORK ASSIGNMENT:

Answer questions in California workbook, Part 1, pp.

Page 10 - 1 through 10
Page 11 - 1 through 10
Page 12 - 1 through 10
Pages 20 and 21 - 1 through 12

INTRODUCTION TO NEXT LESSON:

-Study California workbook pps. 22 through 24 and 26 through 28.
Compare above with Washington State Workmen's Compensation Laws.
Instructor make an appointment for safety inspector and Workmen's Compensation Representative to come to class in two weeks.

"HOW TO STUDY"

by James McKinney

Reproduced by Permission of
The American Technical Society

HERE'S HOW

You can make your hours of study more effective and worth while by developing good study habits. Certain methods of doing one's reading and studying have proved more successful and efficient than others for thousands. We want you to benefit from their experiences. Follow these suggested procedures on "How To Study," and you will improve the effectiveness of your studying.

DEVELOP YOUR DESIRE TO LEARN

To begin with, you must give yourself this driving force. Your own desire to learn is a prime requirement for effective study. You must yourself, have a strong urge to learn, to master your studies. The constant thought of a definite goal toward which your studies propel you can help develop your desire to learn. What do you want to get from your studies? What satisfaction will you get out of good work? Keep these thoughts in mind, especially if the going gets tough.

PUT YOURSELF ON A REGULAR STUDY SCHEDULE

Set up a definite weekly time schedule for your study periods. Then stick to your schedule! Plan your week in advance. You should reserve at least six hours per week for your studies. It should not be difficult for the average person to put in from ten to twelve hours per week. Our readers generally have found that you can accomplish more in the consecutive hours of study than in three separate one-hour periods. This is because every time you take up your studies anew, you lose some time in getting in touch with them.

SET UP A REGULAR STUDY PLACE

PRIVATE
STUDY

This may be your kitchen or dining room; or it may be a desk in your living room. If you are fortunate enough to have a private room, all the better. But large or small, private or not, it should be your regular place of study. Get the cooperation of your family or room mates in providing quiet during your study periods. Keep your papers, books, and other study materials at this regular place of study. Protect yourself against avoidable interruptions as much as possible, but do not be annoyed or thrown off your track because they come. Do not face a bright wall or the direct light from a window. A small light, throwing the complete table or desk into illumination, is usually better than a large light coming from above. Place your light so it will avoid causing bad shadows.

KEEP YOUR STUDY PLACE "FIT FOR STUDY"

It should be neat and orderly. You should have not only good lighting but also good ventilation. In winter, maintain room temperature around 68-70 degrees Fahrenheit with proper humidity. Keep circulation of fresh air in the room as much as possible. A good working principle is, "A place for everything and everything in its place." See that the physical conditions for study are the best that you can make them. Do not have things lying around that are likely to distract your attention. Have all your tools before you. Your books, notebook, study guide, paper, pencil, dictionary, reference material--everything you use in studying an assignment--should be within handy reach.

SET UP AN IMMEDIATE GOAL

Each time you sit down to study, decide how much you want to accomplish at that sitting. Know how much you are going to study before you start. Aim at completing a definite number of pages or chapters each time you study. Set your goal - and achieve it - before you put your things away. Your book is a "map to take you somewhere." Your objectives will give you the direction. In achieving your immediate goal, budget your time. For example, if you have set aside three hours on a certain day and have equally important assignments in English and mathematics, try to give each subject an equal amount of your time. Don't spend, for instance, twenty minutes on one subject and the remaining two hours and forty minutes on the other.

REMOVE ANNOYING DISTRACTIONS

Turn off that radio, for one thing. Tests show that it is almost impossible to give undivided attention to your studying while the radio provides background dialogue or music. Shut out as far as possible all distracting noises. You may not have an ideal study setup. It may be the dining room table. Arrange with your family or whoever you live with to help eliminate distracting noises. Program your work to provide for quiet study perhaps early in the morning or late at night — whenever there are the least distractions. If you must put up with noise and interruptions to a certain extent, learn to concentrate in spite of them.

UNDERSTAND WHAT YOU READ

Levin, in his book, "How To Read For Self-Improvement," gives you a tested reading plan which will greatly improve the efficiency of your study habits. It calls for three readings of each assignment, but in the long run it saves time.

First Reading - Read rapidly. Pay attention to the main topics and don't worry about details. Get the bird's-eye view first; lay hold of the key divisions of the subject. What does the author emphasize? On your first reading, then, read carefully but just as rapidly as you can.

CHALLENGE THE AUTHOR

Second Reading - Read less rapidly and more thoughtfully. This is a slower reading. Look now for the details which describe and amplify the main topics. Read slowly and absorb every idea. More than that, think. Question the test critically; challenge the author to prove his assertions. In other words, read actively. Be sure you understand the meaning of words. Use your dictionary; build your vocabulary by writing in your notebook any word not clear to you. Review this list periodically.

MAKE NOTES AS YOU STUDY

Third Reading - Read as rapidly as you can. This is a review reading in which you should get the full benefit from your two previous readings. On this reading, take notes. Jot down the most important points. Note taking is valuable. Mark up your books if you feel this will help you remember important points. Note taking is valuable. Mark up your books if you feel this will help you remember important points. Your books are yours to keep and to use in the most effective way. Note taking impresses what you read more firmly in your mind, and it provides you with helpful reference material. By reviewing your notes before proceeding to your next assignment, you are better prepared to go on.

APPLY WHAT YOU LEARN

Use your knowledge. You learn by doing, and through application of new knowledge, you expand what you already know. However, unless you have properly understood your reading and followed your directions carefully, you will encounter difficulty. By doing, you will soon discover the flaws in your learning. So use your knowledge. Think, talk, and write about the things you are learning--with your family, friends, and fellow workers. The actual use of knowledge is the surest test of your ability to make it your own. Use your knowledge, and you will remember it.

CONCENTRATE

Concentration is a matter of training, of self-discipline. To concentrate means to limit your thoughts to a single definite object--to give it your undivided attention. To learn how to concentrate, relax a few moments before coming to your studies. Relax mentally and physically. Then put your whole attention to your study. Shut out all other thoughts. If your mind wanders stand up and stretch, take a deep breath of fresh air, then come back to your study. Watch your sitting posture; check your lighting and room ventilation. Now get down to your study again. Relate every new idea in your studies to your life and thinking. When you read, put something of yourself into your reading. Concentration gives you power. It enables you to throw off little disturbances and keep you right at your task of learning.

NO ROYAL ROAD TO LEARNING

You may be denied the benefits of a special room for study and ideal conditions in regard to light and other conveniences, but this should not stop you from reaching your goal. Remember, no matter how severe your handicap, there are other people who have become world-famous in all lines of endeavor, and who had fewer advantages than you. It has been proved in all generations.

Back in the days when the Old World culture was at its height, we find a man like Epictetus, a lame slave, who became world-famous as a philosopher; he contended that seeming disadvantages were after all really advantages. Again, there was Demosthenes, who with his feeble body and defective speech, became one of the world's famous and greatest orators. Later, there was the blind Milton gaining immortality through his poetry; Robert Burns, the plowman, breathing the brotherhood of man in his songs; Wedgwood, poverty-stricken, being forced to burn his furniture to bake his lovely pottery; Lincoln, fighting against ignorance, poverty, and melancholia for knowledge and the power to think clearly; and Beethoven, deaf, composer of the immortal Night Symphony of which he never heard a note. In more recent times we find men like the late Edwin B. Frost, the astronomer, who, though blind, charted the heavens with his mathematical formulas; Steinmetz, the hunchback, who became an electrical wizard; and a host of others, who all stand out as examples to remind us that ----

The heights of great men reached and kept,
Were not attained by sudden flight,
But they while their companions slept,
Were toiling upwards through the night.

To be able to concentrate is one of the most important qualities for success; you cannot buy it, you cannot borrow it, but you can develop it as a part of your own personality and like a good name, it is more to be desired than riches.

UNIT A - TOPIC 1

The apprentice and his trade.

LESSON OBJECTIVE:

Know laws and regulations affecting apprentice's responsibilities and benefits.

STUDY ASSIGNMENT:

Federal Laws for Employee's Security,
California Workbook, Pages 22 through 24

Washington State Workmen's Compensation Laws,
Manual and Handout sheets

Workmen's Compensation Law,
California Workbook, pp. 26 - 28.

IMPORTANT STUDY FACTORS:

Social Security
Workmen's Compensation
Employee and Employer Relations

REFERENCES:

Washington State Workmen's Compensation Laws
Washington State Unemployment Compensation Laws
Carpenter's Unit 1, pp. 151-152
California Workbook, Part 1, pp. 22 - 24, 26 - 28
" " " " " 1 - 4, and 9 - 14

INTRODUCTION TO NEXT LESSON:

Have student locate and inspect first aid kit and whom to report to, in his shop in case of accident.

Have student read California workbook, Part 1, pp. 13 - 14.

Announce next week safety inspector and workmen's compensation representative will be guest speakers.

COORDINATING COUNCIL FOR OCCUPATIONAL EDUCATION
OLYMPIA, WASHINGTON

LEGISLATION AFFECTING WORKERS

REVISED TO FEBRUARY 1, 1971

In recent years many laws have been passed on both federal and state levels that directly affect the working man, his family and dependents. In the apprentice training time available we cannot go into detail about all this legislation. In this lesson the highlights of the most important laws will be discussed. If an apprentice wishes to seek further detailed knowledge about any of them, he should contact his public library, one of the local offices indicated, his employer or his union. Included in this lesson are industrial insurance, unemployment compensation, old age and survivor's insurance, and wages and hours laws.

A. INDUSTRIAL INSURANCE (WORKMEN'S COMPENSATION ACT)

One of the purposes of the Workmen's Compensation Act is to afford to the worker certain and speedy relief in case of industrial accident. The purpose of this lesson is to reduce the law to simple and understandable terms, and to assist in promptly obtaining all the benefits of the Workmen's Compensation Act of the State of Washington. This information is general in nature, and is to serve as a guide in the situations which are most likely to arise under the Act.

1. Workers covered: Generally speaking, all employees engaged in manual labor are automatically covered. Deductions which are automatically made from salary or wages for medical aid (this should not be confused with health coverage as it requires the consent of employee) are proof of coverage by Workmen's Compensation Act. However, employees may be covered without deductions for medical aid being taken from their salary or wages if the employer chooses to absorb these premiums rather than charge them to the employee.

With the approval of their employer, employees who are not otherwise covered may obtain coverage. Such coverage must, of course, be obtained prior to the injury for which a claim is to be made. Forms and information may be obtained from any Service Location of the State Department of Labor and Industries or from the main office in Olympia.

2. How the Workmen's Compensation Act is financed: The premiums for medical benefits, called medical aid premiums, are paid one-half by the employer and one-half by the employee through payroll deductions. It is not unlawful, however, for the employer to absorb the entire medical aid premium and not charge any part of it to the employee.

The premiums for compensation benefits, including monthly compensation for loss of time from work and all disability awards and pensions (called industrial insurance premiums) are paid entirely by the employer. It is unlawful for the employer to charge or deduct from wages or salary any part of such premiums.

Rights to compensation and medical care are not affected by any other insurance which the employee may have. Employees can accept any benefits to which they may be entitled under any other type of insurance and in addition thereto be entitled to receive full industrial insurance benefits from the Department of Labor and Industries.

Payment cannot be reached by creditors through garnishment, execution or attachment until such time as the warrant covering such payment has actually been delivered to the employee by the Department of Labor and Industries.

3. Industrial insurance benefits:

a. Medical benefits include doctor, hospital and nursing care, including x-rays and drugs prescribed by your attending physician, glasses, dental repairs and dentures, artificial appliances, eyes and limbs, where necessary because of an industrial injury or occupational disease.

b. Compensation for loss of time from work is not paid for the day of injury or the three days following said injury, unles the disability continues for 30 or more consecutive calendar days from date of injury. If employer continues to pay full wages or salary, by other than vacation pay, the employee is not entitled to receive monthly time loss compensation. If employee returns to work before his claim is closed and is unable to earn full previous wage or salary due to injury, he will receive the proportionate share of monthly time loss compensation. Scheduled rate of compensation payments for injuries occurring on or after August 6, 1965, are as follows:

SINGLE	$ 185.00
MARRIED	215.00
MARRIED with ONE child under 18 years	252.00
MARRIED with TWO children under 18 years	283.00
MARRIED with THREE children under 18 years	306.00
MARRIED with FOUR children under 18 years	329.00
MARRIED with FIVE children under 18 years	352.00

Payment of monthly time loss compensation has no relationship to whetherthe claimant is receiving vocational rehabilitation services, but is allowed only when his condition, due to his injury, prevents him from working and is not yet medically fixed. Rate of compensation is governed by the law in effect on the day of the injury.

c. Compensation for permanent partial disability: Lump sum award for injury which causes some permanent partial disability but which does not prevent worker from resuming some gainful occupation. Amount of compensation to which employee is entitled is based on certain schedules which are set forth in the law. Awards vary from $270.00 for loss of little finger at distal joint to $15,000.00 for loss of arm or leg at shoulder of hip joint.

d. Compensation for permanent total disability: Provision is made for a pension to a totally permanently disabled worker (added payments for children under 18 years) and pension thereafter to his widow. A total permanently disabled worker is one whose injury completely and permanently disables the worker from regularly following a gainful occupation. A single worker's monthly compensation is $185.00, a married worker's $215.00, a widow with or without minor children $140.00, the youngest child $37.00, next youngest $31.00, each additional child $23.00 (for a maximum of five children.)

e. Compensation for fatal injuries: Provision is made for a pension for widow or invalid widower and for minor children of a worker killed in an industrial accident. The widow or invalid widower would receive $140.00 per month, the youngest child $37.00, the next youngest child $31.00, each additional child $23.00, with maximum for the family $277.00.

4. Ten commandments for injured workmen:

1. Immediately upon the occurrence of an injury give notice of such injury, regardless of how trivial it may appear to be. Report to the person designated by the employer to receive notice of accidents.

2. As soon as employee is physically able he should fill out Report of Accident (or Report of Occupational Disease), at the doctor's office of the hospital. This report should be left with the doctor.

3. After employee has completed his part of the Report of Accident and left it with the doctor, he should check to see that the report is completed by the doctor and mailed to the employer.

4. After four weeks from the signing of the Report of Accident, if some word or acknowledgement has not been received, check with the employer to see if report was received by him from the doctor, acted upon, and turned in to the Department of Labor and Industries.

5. After six weeks, if still no acknowledgment has been received, advise the Department of Labor and Industries through a Service Location or by writing directly to the main office in Olympia, giving name and address of employer, the doctor, nature of injury, and the date of injury. No action can be taken until report is filed.

6. As soon as possible employee should get the names and addresses of all witnesses who saw the accident or who have knowledge concerning the same and have such information available if there is an investigation of the claim.

7. While employee is off work, he will receive each month a postal card, called a "certificate of disability", containing portions to be filled in by the doctor and by the workman. This card should promptly be filled in by both doctor and employee and returned to the Department of Labor and Industries. Payment cannot be made for loss of time from work until this card is returned.

8. Read all communications from the Department of Labor and Industries and follow carefully all instructions.

9. After an award of compensation has been made to the employee (or other final action taken, such as rejection) which he believes to be incorrect or unlawful, he must apply for reconsideration within sixty days after receipt of printed order.

10. After a claim is closed, application for further compensation or treatment can be made providing that employee's condition has become worse since the closing of the claim. Such application must be filed with the Department of Labor and Industries within five years from the date of the closing order.

5. Filing limitations: A workman loses his rights, irrespective of the merits of his claim, unless he meets certain deadlines for filing necessary reports and applications with the Department of Labor and Industries. These limitations are as follows:

Time limit for filing of claim: 1 year after the day upon which the injury occurred.
Time limit for protest or request for reconsideration of an order of the Department must be received by the Department within 60 days from date of receipt of the order. This also applies to appeals to the Board of Industrial Insurance Appeals which is a separate agency composed of a representative from labor, one from management and one from the general public.
Time limit for appealing to court from the Board of Insurance Appeals final order: 30 days.
Time limit for requesting reopening of claim: 5 years

NOTE: Information regarding Industrial Insurance was taken from a pamphlet entitled: "Reference Manual Relative to Benefits Under Workmen's Compensation and Medical Aid Acts, State of Washington" and published by the Department of Labor and Industries of the State of Washington. For copies of this manual and for additional information contact any of the following Service Locations or the Department of Labor and Industries:

Aberdeen
Bellingham
Bremerton
Ephrata
Everett
Kennewick
Longview
Mount Vernon
Port Angeles
Seattle
Spokane
Tacoma
Vancouver
Wenatchee
Yakima

B. UNEMPLOYMENT COMPENSATION

Under the Federal-State system of unemployment compensation, established under the Federal Social Security Act and the Washington State Employment Security Act, there has been developed the particular program that seems best adapted to conditions prevailing within this state. It is important that apprentices know the details of the employment security program and understand how it functions.

1. Who is covered? In the State of Washington a worker in any firm employing one person at any time is covered by the plan, unless specifically excluded such as: agricultural labor, domestic service in private homes, service for relatives, and self-employment including agents on commission.

2. How is the program financed? This state finances unemployment benefits mainly by contributions from employers on the wages of their workers. There is no tax on employees or deduction from wages. The funds collected are held for the state in the unemployment trust fund (at interest) in the United States Treasury. From this fund, money is drawn to pay benefits. The maximum rate for employer contribution is 2.7% of wages paid, limited to the first $4,200.00 earned by each worker within a calendar year. Congress makes appropriations for the cost of administration of this Federal-State program.

3. How does one qualify for benefits?

a. You must be unemployed to the extent that your earnings are less than your benefits would be for total unemployment.

b. You must have earned not less than $1100 in the first four of the last five completed calendar quarters prior to the quarter in which you file the initial claim for benefits. (The qualifying amount is adjusted annually.)

c. You must register for work with the Employment Service.

d. You must file a claim for benefits (by mail if necessary) and must serve one "waiting week" during which you are not employed.

e. You must be actively seeking work, be physically able to work, and immediately available for work.

f. You must report each week in person unless directed otherwise by the person taking your claim.

4. What are the benefits? The amount of your benefits is determined by your earnings during the four-quarter period mentioned in 3 b. That four-quarter period is called the base year.

5. What will cause one to become disqualified?

a. Failure to apply for available suitable work or refusal to accept suitable work without good cause disqualifies for benefits from the date of such failure or refusal and until the individual returns to work and earns an amount equal to his weekly benefit amount in each of five calendar weeks.

b. Voluntarily quitting work without good cause disqualifies for benefits for that week and for the next ten weeks.

c. Being discharged or suspended for misconduct connected with your work disqualifies for benefits for that week and for the next ten weeks.

d. Knowingly withholding a material fact or making a misrepresentation or false statement in order to obtain benefits disqualifies for benefits for that week and for an additional 26 weeks whenever a claim is filed after being thus disqualified. Criminal prosecution is also a possibility.

e. Being out of work because of labor and management disputes, generally speaking, disqualifies for benefits.

6. Can one appeal a determination of disqualification? An appeal in writing submitted within ten days of the mailing or personal delivery of a notice of disqualification, and delivered to the State Employment Security Office or a local office, will be considered first by an examiner of the department. A second appeal will be heard and determined by the Employment Security Commissioner. Following this, appeal may be made to the courts.

7. Administration. In this state unemployment compensation is administered through the Employment Security Department of the State government. Its executive officer is the Commissioner, who appoints nine members to a state advisory council (3 employers, 3 employees, 3 public). The state council shall aid the agency in formulating policy and discuss problems related to the administration of the unemployment insurance act and assure impartiality and freedom from political influence in the solution of such problems. All employees of the department, except policy-making heads, are appointed on a merit basis.

Information taken from:
Comparison of State Unemployment Insurance Laws as of July 6, 1969, published by the United States Department of Labor, Bureau of Unemployment Security, and

Unemployment Compensation Information for Claimants
SF 8139 (Rev. 11-70)

C. SOCIAL SECURITY (Old Age Survivors Insurance)

The social security act was established by Congress in 1935, at which time the Social Security Board consisting of three members nominated by the President and confirmed by the Senate was established to administer the program of old age and survivors insurance for industrial and commercial workers and their dependents.

The President's reorganization plan No. 2, effective July 6, 1946, abolished the three-member Social Security Board and transferred its functions, as well as certain other federal functions, to the Federal Security Administrator, head of the Federal Security Agency, of which the Social Security Board was a part. On that date the Social Security Administration was established, with the former Chairman of the Board as Commissioner for Social Security.

On April 11, 1953, the Department of Health, Education and Welfare was established with the Social Security Administration as a component of that department. Within the Social Security Administration are four bureaus: Bureau of Old-Age and Survivors Insurance; Bureau of Public Assistance; Children's Bureau; Bureau of Federal Credit Unions.

The Social Security Act has been amended several times since its original passage. As a result, monthly benefits may be paid to the families of retired, disabled, or deceased workers, as well as to the retired or disabled person himself. The benefit amounts have been materially increased over the years until now the minimum benefit amount is $64.00 and the maximum is $434.40 a month on any one social security account. The benefit amounts are subject to fluctuation and current amounts can be ascertained by inquiry at any Social Security Administration office or from their publication SSI-35. Coverage has been extended so that now over nine out of every ten persons earning a living are covered under the program. The following summary describes the old-age, survivors and disability insurance program including the amendments of 1970.

1. Benefits payable to:

a. Retired worker age 65 or woman worker age 62.

b. Wife of retired worker if she is age 62 or over, or regardless of age if entitled child under 18 or adult disabled child is present. Dependent husband* of retired worker if he is age 65 or over.

c. Widow or dependent widower,* age 62 or over, of deceased worker.

d. Children (under age 18) of retired worker, and children of deceased worker and their mother (the worker's widow, or in some cases his divorced wife) regardless of her age. Adult disabled children qualify as though they were under age 18.

e. Dependent parents,* age 65 for father, 62 for mother, or over, of deceased worker.

f. In addition, a lump sum payment upon death of an insured worker.

* Proof of dependency must, in general be filed within two years of worker's entitlement in cases of a dependent husband, and within two years of death in cases of a dependent widower or dependent parent.

2. Insured status:

a. Based on "quarters of coverage." An individual paid $50 or more of non-farm wages in a calendar quarter is credited with a quarter of coverage for the quarter. ($7800 of wages in a year automatically gives four quarters of coverage.) An individual paid $100 or more of farm wages in a year is credited with one quarter of coverage for each full $100 of such wages ($400 or more of such wages automatically gives four quarters of coverage.) An individual with creditable self-employment income in a year (in general, $400 or more) automatically receives four quarters of coverage.

b. Fully insured status gives eligibility for all benefits except dependent husband's benefits and dependent widower's benefits,which require both fully and currently insured status, and child's benefits in respect to a married woman which may be payable only if she has currently insured status. A fully insured person is one who at or after attainment of retirement age, onset of disability, or death fulfills any one of the following three alternative requirements:

1. Has 40 quarters of coverage.

2. Has at least 6 quarters of coverage and at least one quarter of coverage (acquired at any time after 1936) for every two quarters elapsing after 1950 (or age 21, if later) and before retirement age, onset of disability, or death.

3. Has a quarter of coverage in all but four of the quarters after 1954 (but not including the quarter in which he attains retirement age, becomes disabled or dies.)

Most persons who become fully insured will go under the first or second alternatives. The second alternative enables a person who attained retirement age after July 1954 to become fully insured with just six quarters of coverage acquired at any time. Elderly persons who are newly covered under the 1954 or 1956 Amendments may meet the third alternative even though not the second. The third alternative is not effective in any case for persons reaching age 65 or dying after September, 1960.

c. Currently insured status (eligible only for child, mother, and lump-sum survivor benefits; necessary for husband's and widower's benefits), requires 6 quarters of coverage within 13 quarters preceding death or entitlement to old-age benefits.

3. Primary insurance amount:

a. The primary insurance amount is the amount paid to the retired or disabled worker. It is derived from the insured person's average monthly earnings. For those now qualifying for benefits for the first time, average monthly earnings are determined by dividing all covered earnings by all months after December 31, 1936, December 31, 1950, or the last day of the year in which a person reaches age 21, if that date is later than January 1, 1951. The closing date for figuring this average monthly earnings figure is ordinarily the first day of the year in which the person becomes disabled, files his application after reaching retirement age, or dies. As many as five years of the lowest earnings can be dropped out of this computation.

b. The minimum retirement benefit is $64.00 a month and the maximum is $250.70.

c. If a woman elects to receive her benefits starting at age 62 rather than waiting until 65, her payment will be reduced by 20%.

4. Benefits Amounts for Dependents and Survivors, Relative to Worker's Primary Insurance Amount:

a. Wife or dependent husband--one-half of primary.
(Wife's benefit will be reduced by 25% if she files at age 62.)

b. Widow or dependent widower--three-fourths of primary.

c. Child--one-half of primary, except that for deceased worker's family, an additional one-quarter of primary is divided among the children.

d. Dependent parent--three-fourths of primary.

e. Lump-sum death payment--three times primary, with $255 maximum.

f. Maximum family benefit is $434.40.

g. Minimum amounts payable to any survivor beneficiary where only one is receiving benefits is $38.90.

h. For examples of monthly payments beginning January 1, 1970, see pamphlet publication of the U. S. Department of Health, Education and Welfard, Social Security Administration SSI-35, May, 1970.

5. Employment permitted without suspension of benefits (Called "Work Clause" or "Retirement Test"):

A beneficiary can earn $1680 in a year in any employment, covered or noncovered, without loss of benefits. In no case, however, are benefits withheld for any month in which the beneficiary's remuneration as an employee was $140 or less and in which he rendered no substantial services in self-employment. For beneficiaries age 72 or over, there is no limitation. If a retired worker's benefit is suspended, so also are the benefits of his dependents.

6. Covered employment:

a. All employment listed below which takes place in the 48 states, the District of Columbia, Alaska, Hawaii, Puerto Rico, or the Virgin Islands, or which is performed outside the United States by American citizens employed by an American employer, (or, by election, by an American citizen employed by a foreign subsidiary of an American employer) is covered employment. Also covered, under certain conditions, is employment on American ships and aircraft outside the United States.

b. Individuals engaged in the following types of employment are covered:

1. Virtually all employees in industry and commerce, other than long-service railroad workers (the service of those who retire or die with less than ten years of railroad service is covered.)
2. Farm and nonfarm self-employed with $400 or more of net earnings from covered self-employment.
3. State and local government employees not covered by a retirement system, and those covered by a retirement system on a referendum basis in which a majority of those eligible to vote are in favor of coverage; in any event, the State must elect such coverage.
4. Nonfarm domestic workers (based on $50 in cash wages from one employer in a quarter.)
5. Farm workers, including farm domestic workers (based on $150 or more in cash wages from any one employer in a year.)
6. Ministers and members of religious orders (other than those who have taken a vow of poverty) either employed by non-profit institutions (in positions which only a minister can fill) or self-employed are covered on individual elective basis as self-employed. Other employees of non-profit institutions are covered on elective basis; employer must elect coverage, and at least two-thirds of employees must concur in coverage (then all employees concurring in coverage and all new employees are covered).
7. Federal employees who are not now covered by retirement system established by law of the United States other than a few specifically excluded small categories.
8. Definition of "employee" is broadened from strict common-law rule to include following groups as "employees"; full-time wholesale salesmen; full-time life insurance salesmen; agent-drivers and commission drivers distributing meat, vegetable or fruit products, bakery products, beverages (other than milk), or laundry or dry cleaning services; and industrial homeworkers paid at least $50 in cash during a quarter and working under specifications supplied by employer.
9. Members of the Armed Forces.

7. Wage credits for World War II and subsequent military service:

World War II veterans and those in service thereafter (including those who die in service) are given wage credits of $160 for each month of active military (including naval) service in World War II and thereafter through December, 1956, except that credit is not given if service is used for any other Federal retirement or survivor system (other than compensation or pensions payable by the Veterans Administration); additional cost is to be borne by trust fund.

8. Maximum annual wage and self-employment income for benefit and contribution purposes:

$4800 per year for 1959 and after ($4200 in 1955-58, $3600 in 1951-54 and $3000 before 1951). $6600 in 1966-67, $7800 in 1968-____.

9. Tax (or contribution) rates:

a. 2-1/4% on employer and 2-1/4% on employee through 1958, 2-1/2% for 1959, 3% for 1960-62, 3-1/2% for 1963-65, 4.2% for 1966, 4.4% for 1967-68, 4.8% for 1969-70, 5.2% for 1971-____.

b. For self-employed the rate is 1-1/2 times that for employees. Self-employment income taxed is, in general, net income from trade or business; special optional provisions based on 50% of gross income are available for farmers with low net income.

c. No provisions for authorizing appropriations from general revenues to assist in financing the program.

For further information contact one of the 13 district Social Security offices in the following Washington cities. The offices are listed in local phone books under "United States Government, Health, Education and Welfare, Dept. of."

Aberdeen
Bellingham
Bremerton
Everett
Lewiston, Idaho
Olympia
Seattle

Spokane
Tacoma
Vancouver
Walla Walla
Wenatchee
Yakima

D. FEDERAL WAGE AND HOUR LAW

The Fair Labor Standards Act of 1938, known as the Federal Wage and Hour Law, was approved by the President on 25 June, 1938, and became effective 24 October 1938. This legislation is one of the most important labor measures adopted in recent years, for it seeks to correct and to eliminate as rapidly as possible in industries engaged in interstate commerce or in the production of goods for interstate commerce, or enterprises with an annual dollar volume in excess of $250,000, labor conditions detrimental to the maintenance of minimum standards of health, efficiency and general well-being.

The Law creates a Division of Wages and Hours within the Department of Labor under the direction of an administrator appointed by the President by and with the advice of the Senate.

The Fair Labor Standards have been amended, the latest effective February 1, 1967, providing the following standards: A minimum wage of $1.60 an hour; time and one-half pay for overtime after 40 hours (except where otherwise specially provided); a minimum age of 14 years for general employment (except for occupations declared hazardous and certain occupations outside of school hours).

The child labor provisions of the law prohibit producers, manufacturers, and dealers from shipping through interstate commerce, goods produced in an establishment in which within 30 days prior to shipment oppressive child labor has been used. The term "oppressive child labor" applies to employees under the age of 14 years in any occupation or employees between the ages of 16 and 18 in any occupation which has been found and declared by the Children's Bureau to be particularly hazardous for children or detrimental to their health and well-being.

Farm workers, newspaper delivery boys, employees in small (under $250,000) retail and service establishments, employees of street, suburban, interurban electric railway or motor bus carriers, seamen, and persons employed in bona fide executive, administrative, and professional capacities are exempt from both the wage and hour provisions of the law.

The act has conferred broad investigatory powers on the Administrator as to wages, hours and other conditions and practices of employment in any industry subject to the act. He may utilize the services of the bureaus and divisions of the Department of Labor for necessary investigations and inspections, as well as the services of the State and local agencies. The Administrator is empowered to order employers to maintain adequate records on wages and hours.

The law provides that any person wilfully violating the Act is subject to a fine and imprisonment. However, no penalty or imprisonment may be imposed for a first offense. An employer violating the hour or wage provisions of the Act may be liable to his employees for twice the difference between the wage received and the legal minimum wage, and also for any unpaid overtime compensation.

For further information see "Handy Reference Guide to the Fair Labor Standards Act" and CL 101, or Fair Labor Standards Act of 1938 as Amended, U.S.D.L. Publication 1167.

- - - - - - -

NOTE: Instructors should be alert to legislative changes affecting the worker. References below are to sources of information in the several departments and their informative manuals which are kept up to date and available at the listed locations.

A. Reference Manual relative to benefits under the Workmen's Compensation and Medical Aid Acts

State Industrial Insurance Office
State Administration Building, Olympia, Washington

B. Unemployment Compensation Information for Claimants S.F. 8139 (Rev. 11-70)

Employment Security Building, Room 417
Olympia, Washington

C. Your Social Security SSI-35

Social Security Administration
1007 South Washington Street
Olympia, Washington

D. The Construction Industry Under Fair Labor Standards Act W.H. 1310 Oct. 70

Regulations - Labor Standards Provisions WHPC #1244

Public Contracts Act - Rulings and Interpretations No. 3 - May 1963

U. S. Department of Labor
Smith Tower Building Room 1821
Seattle, Washington

CABINETMAKING AND MILLWORK

TOPIC:

Safety on the Job.

LESSON OBJECTIVE:

Develop safety practice

IMPORTANT STUDY FACTORS:

Students report on first aid status in their shops.
Have students report on shop accidents they have seen and suggest probable cause.

REFERENCES:

California workbook, Unit 1, pages 13 through 16.
Cabinet Making and Woodwork by Dahl and Wilson, pages 10 through 15.

WORK ASSIGNMENT:

Answer questions, California workbook, Unit 1, pages 15 through 16.
Show safety film on "Eyes." Check film list and source.

CABINETMAKING AND MILLWORK

UNIT B - TOPIC 1

Mathematics of the Trade

LESSON OBJECTIVE:

1. To determine apprentice ability to do necessary arithmetic in the trade
2. To help instructor plan remedial work in mathematics
3. To teach how to calculate board measure: linear feet, square feet, and board feet, and review cancellation of fractions (related to board feet)

STUDY ASSIGNMENT:

Practical Math., also 111-148, 43-49
Math. for Carpenters, also 16-19
Multiplication tables: pp. 12-16 Practical Math.
or p. 5 Math. for Carpenters

REFERENCES:

Practical Mathematics; Hobbs, G. M., McKinney, J., & Dalzell, J. R.
Mathematics for Carpentry, United B. C. & J. of America

WORK ASSIGNMENT:

Test of 50 assorted basic math problems.
After diagnostic test, instructor works some board measure problems with class. Can discuss how wood is purchased: Lumber--by bd. ft., plywood--by sq. ft., trim--by lin. ft., etc. For motivation and interest, discuss grading and ordering of lumber or plywood or trim.

INTRODUCTION TO NEXT LESSON:

Work problems 1-9, p. 16 at home.
Work problems 1-6, p. 18 at home.
Work problems 1-4, p. 19 at home (division problems)

Support = Page .02 Diag. Test
Page .03 Handout on
Board Measure

CABINETMAKING AND MILLWORK

UNIT B - TOPIC 1

Mathematics of the Trade

DIAGNOSTIC TEST

Work each of the following problems, and write your answer on the blank line in front of the number.

____________________ 1. Add 1/2, 3/4, 1/16, 5/8.

____________________ 2. Multiply 1/8 x 2/3.

____________________ 3. Change 3/8 to sixteenths.

____________________ 4. Subtract 9/16 from 3/4.

____________________ 5. Divide 5/8 by 3/16.

____________________ 6. Change 3/4 ft. to inches.

____________________ 7. What is 9/8 divided by 4?

____________________ 8. Express 23% as a decimal.

____________________ 9. State the sum of all the interior angles of any triangle.

____________________ 10. A contractor's profit was $36.00. His profit was 8% of his cost. What was the amount of the contract?

11. Convert the following fractions to a decimal:

____________________ a. 1/16"

____________________ b. 3/16"

____________________ c. 1/4"

____________________ d. 1/2"

____________________ e. 7/8"

12. Add the following fractions:

____________________ a. 1/16, 3/8, 3/4

____________________ b. 3/4, 15/16, 1/2

____________________ c. 7/8, 3/16, 11/16

____________________ d. 1/8, 12/16, 1 3/8

DIAGNOSTIC TEST (cont'd)

__________ 13. Write 201/16 as a mixed number.

__________ 14. Subtract 9/4 from 2 7/8.

__________ 15. Divide 1 9/16 by 5/4.

__________ 16. 7/8 ÷ 3/2 = what?

__________ 17. Write 5 7/16 as an improper fraction.

__________ 18. Subtract 8 25/32 from 10 3/4.

__________ 19. Add 3 1/2, 4 5/16, 2 1/8, 3 3/4.

__________ 20. Change 20/16 to lowest terms.

__________ 21. How much is 9/8 divided by 1/4?

__________ 22. Divide 42' 5 1/4" by 7.
(Answer in feet and inches.)

__________ 23. Round off to nearest tenth:
1.0625

__________ 24. Round off to nearest hundredth:
69.3875

__________ 25. A contractor's monthly bank statement showed a balance of \$8,638.17. The next day he wrote checks for \$3.89, \$450.00, \$18.25, and \$114.68. What was his new balance?

__________ 26. Change 215 pieces to dozens.

__________ 27. Change 2 1/2 gross to number of pieces.

__________ 28. Change 3 3/4 dozen to number of pieces.

__________ 29. Subtract 5' 3 1/8" from 10' 2 9/16".

__________ 30. Multiply 5' 2 3/8" by 24.

__________ 31. Change to square inches: 5 1/2" x 2' 4 1/2"

__________ 32. Change to cubic feet: 9' x 7' 6" x 10'.

__________ 33. Change to board feet:
300 linear feet 1" x 4"

__________ 34. Interest is charged at the rate of 6% per year on a contract of \$3400. What is the amount of one month's interest?

DIAGNOSTIC TEST (cont'd.)

__________ 35. Convert 104.27' to feet and inches.
(to the nearest 1/8")

__________ 36. Add:
2' 2 1/2"
5' 6 3/4"
8' 9 5/16"

37. Convert these decimal fractions to common fractions
(to the nearest 1/16th)

__________ a. .125"

__________ b. .44325"

__________ c. .28"

38. How many board feet in:

__________ a. 16 pcs. 2" x 10" 14' long

__________ b. 20 pcs. 5/4" x 6" 12' long

__________ 39. What is the cost of 125 B.F. of mahogany priced at $365.50 per M?

__________ 40. How many sq. feet of plywood are there in 50 4' x 8' panels?

CABINETMAKING AND MILLWORK

HANDOUT ON BOARD MEASURE

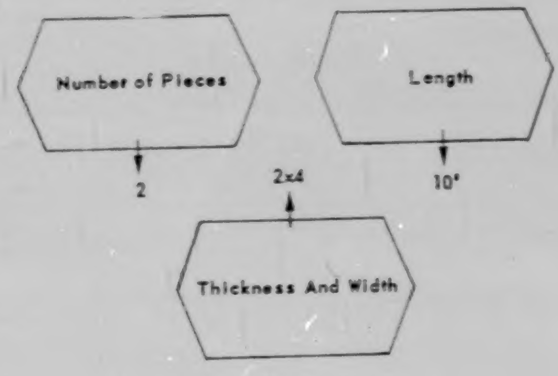
An interesting background chapter on Lumber in general is found on pp. 81-97 in Cabinetmaking and Millwork. A good picture of what an actual board foot of lumber may look like is found on p. 82.

The U.B.C. & J.A. Mathematics Manual gives examples of board measure problems on p. 63.

For some review ideas on canceling fractions when multiplying, look back on page 17 of the Mathematics Manual.

A few basics:

1. How do you "call out" a lumber order?



To change this to board feet, DIVIDE BY 12

$$= \frac{2 \times 2 \times 4 \times 10}{12}$$

2. Linear feet are a combination of number of pieces and the lengths it takes to make up the total:

500 lin. ft. could be
(a) 50 pcs. 10'
or
(b) 20 pcs. 16' = 320 lin.
8 pcs. 14' = 112 lin.
5 pcs. 12' = 60 lin.
1 pc. 8' = 8 lin.
500 lin.
or
(c) Some other combination that would amount to 500 feet placed end to end.

When you have linear feet already, simply multiply by thickness and width and divide by 12

$$= \frac{500 \cdot 2 \cdot 4}{12}$$

3. If the length of the board is in inches, either
(a) change the inches to feet and use the same formula
or
(b) Keep the length in inches but divide by 144 instead of 12

CABINETMAKING AND MILLWORK

UNIT B - TOPIC 2

Mathematics of the Trade

LESSON OBJECTIVE:

1. To build proficiency in math. as needed in the trade
2. To encourage and develop the ability to add, subtract, multiply and divide fractions that are common use in cabinetry

STUDY ASSIGNMENT:

1. Read p. 35, California Workbook
2. Read pp. 10-19, U.B.C. Math. Manual

REFERENCES:

California Text
Mathematics for Carpentry, U.B.C. and J.A.

WORK ASSIGNMENT:

Review Test on Board Measure, pp. 41-42, California Testbook
After-study assignment, pp. 23-28, California Testbook
For real sharp student: p. 19, U.B.C. & J.A. Manual, problems 1-7 or comparable problems involving multiplication or division of fractions

INTRODUCTION TO NEXT LESSON:

Mention that the practical use of decimals around the cabinet shop will be discussed and worked on next week.

CABINETMAKING AND MILLWORK

UNIT B - TOPIC 3

Mathematics of the Trade

LESSON OBJECTIVE:

To familiarize the student with decimal equivalents.
To review costs and percentages.

STUDY ASSIGNMENT:

California Workbook, pp. 38-39.
Carpenters Manual, pp. 23, 25.

REFERENCES:

California Workbook
Mathematics for Carpentry, UBC & JA.

WORK ASSIGNMENT:

California Testbook, pp. 29-32, 33, 35-36.

INTRODUCTION TO NEXT LESSON:

Final scheduled math session next week. (Work problem on page 44.) Review Workbook on former lessons and prepare for a general review test on the work covered.

CABINETMAKING AND MILLWORK

UNIT 3 - TOPIC 4

Mathematics of the Trade

LESSON OBJECTIVE:

To develop a greater ease in student as he handles the breakdown of parts, whether the units are feet and inches or inches and a fractional part of an inch.

To multiply or divide compound number units.

STUDY ASSIGNMENT:

California Workbook, pp. 40-43
Mathematcis for Carpentry, review p. 74 on weights and measures.

REFERENCES:

California Workbook
Mathematics for Carpentry, UBC & JA

WORK ASSIGNMENT:

Go over answers to problems on p. 44 of California Workbook.
California Testbook, pp. 37-39.
Final Test (A rather short and practical test of each item covered. (Such as page 02.01.07.02 and more.)

INTRODUCTION TO NEXT LESSON:

Hand out a piece of wood to each student to identify and ask questions about at the job. Selection and treatment of woods is next week.

CABINETMAKING AND MILLWORK

FRACTIONS QUIZ

__________ 1. Written as a MIXED NUMBER, 11/4 would be:

__________ 2. Written as an IMPROPER FRACTION, 3-2/3 would be:

__________ 3. Reduced to LOWEST TERMS, 3-9/12 would be:

__________ 4. Written as a DECIMAL FRACTION, 5/6 would be:

__________ 5. Written as a COMMON FRACTION, 66-2/3% would be:

__________ 6. Written as a COMMON FRACTION, .25 would be:

__________ 7. The LOWEST COMMON DENOMINATOR of 1/16", 1/8", 1/4", 1/2" is:

__________ 8. INVERTED for division, 1-5/6 would be:

Which explanation gives the meaning normally associated with the following signs:

__________ 9. × or .

__________ 10. ÷

__________ 11. $\sqrt{}$

__________ 12. +

__________ 13. Number^2 ← (When 2 is written here)

a. the square root of
b. the number times itself
c. multiplied by
d. the number doubled
e. divided by
f. added together
g. pi
h. included in
i. is similar to

__________ 14. A decorative fence has six equally spaced posts that are 3-5/8" square. From outside the first post to outside the last post is 37' 7-1/8". The center to center spacing of these posts is: (Answer to the nearest 1/8")

__________ 15. Expressed as the fractional part of a FOOT, how much is 16"?

__________ 16. How many BOARD FEET in 35 pcs., 2 x 10, 14' long?

__________ 17. If π is 3-1/7, how would it be written as an IMPROPER FRACTION?

__________ 18. How many 1/16" units are there in one inch? $\frac{\text{part}}{\text{whole}}$

__________ 19. How many 1 CUBIC FOOT units are there in one CUBIC YARD?

__________ 20. How many 1" units are there in one FOOT?

__________ 21. How many 1/8" units are there in one INCH?

__________ 22. How many single units are there in one GROSS?

__________ 23 How many SQUARE FOOT units are there in one square YARD?

__________ 24. How many SQUARE FEET are there in one square of roofing?

__________ 25. If I want to find out how many 1/8ths there are in .625", would I multiply or divide by 8?

CABINETMAKING AND MILLWORK

TOPIC:

Selection and treatment of woods

LESSON OBJECTIVE:

To acquire recognition of cabinet shop lumbers and proper selection for beauty and strength.

IMPORTANT STUDY FACTORS:

Characteristics of hard and soft wood.
Abbreviations and grading terms.

REFERENCES:

U.B.C.J. Pages 40 through 46.
Cabinet Making, by Dahl, pages 163 through 188.
Principles of Wood Working, by Holtrop, pages 566 through 570.

WORK ASSIGNMENT:

Answer questions: California workbook, Part 1, page 52.

INRODUCTION TO NEXT LESSON:

Have students bring rough and finished small samples of lumber used in their shops. Each sample should be identified as to variety and where grown.

TOPIC:

Selection and treatment of woods

LESSON OBJECTIVE:

Ability to identify all shop-type lumber.

STUDY ASSIGNMENT:

Compare wood samples

IMPORTANT STUDY FACTORS:

Instructor point out how to determine wood varieties. Show how grains differ.

REFERENCES:

Architectural Woodwork, pages 1 through 27.

WORK ASSIGNMENT:

California textbook, Part 1, pages 45 and 46.

INTRODUCTION TO NEXT LESSON:

Read instructions on field trips.
Announce time and place for next meeting field trip.

CABINETMAKING AND MILLWORK

TOPIC:

Field trip to mill or lumber yard

LESSON OBJECTIVE:

Working knowledge of lumber manufacturing and storage.

IMPORTANT STUDY FACTORS:

Manufacturing equipment.
Drying equipment.

FIELD TRIP - A CHECK-LIST FOR INSTRUCTORS

- I. Preparation
  - A. Teacher Preparation:
    - *1. Make preliminary survey, with listing of situations and points of interest, etc.
    - 2. Estimate length of time involved; also round-trip schedule
    - 3. Decide if entire class or select group should go.
    - *4. Make arrangements with authorities at place of destination.
    - 5. Plan transportation route, in detail.
  - B. Pupil Preparation:
    - 1. Arouse student interest in the projected field trip (by class talk, photographs, bulletin board, etc.).
    - 2. Discuss in class the problems that the trip can help solve.
    - *3. Make clear to students the purpose or purposes of the trip.
    - 4. Develop background by consulting reference materials.
    - *5. Work out for pupils the points to observe during the trip.
    - *6. Set up with them standards for safety and behavior.
    - 7. Give to students any materials that they can use during trip.

- II. Actual Observation:
  - A. Guide is to be given clear idea of the purpose of the trip (set of questions prepared jointly by teacher and pupils).
  - B. Pupils observe and hear the guide's explanations.
  - C. Question period, in which individual questions from pupils are presented and answered by guide and/or teacher and pupils
  - D. Period for note-taking and sketching by pupils

- III. Follow-through:
  - A. Group Discussion in Classroom:
    - 1. Critical evaluation of the place visited
    - *2. Supplementing and correcting incomplete or hazy understandings
    - 3. Introduction of new problems
  - B. Creative Projects:
    - 1. Drawings, poems, stories, construction, bulletin board displays, diaries, etc., based on the trip
    - *2. Writing a letter of thanks to the guide, etc.
  - C. Tests to Determine:
    - 1. Information gained
    - 2. Attitudes formed
    - 3. Generalizations made
  - D. Reports from students:
    - 1. General reports--the all-over subject
    - 2. Special features, reported by students to which these had been previously assigned

- IV. Evaluating -- Before and After:
  - A. Before--
    - 1. Is this destination the best choice for this particular teaching purpose?
    - *2. What plans need be made by teacher and students?

FIELD TRIP - A CHECK-LIST FOR INSTRUCTORS - Continued

*3. Is there reading material on this particular student level?
4. Is the time involved likely to prove worth the undertaking?
5. What relationship can this trip have with other student experiences?
6. What emotional effect is the trip likely to have on the students?

B. After--
*1. Did the trip serve the purpose?
2. Were attitudes affected in the expected manner?
3. Did the trip stimulate the pupils into new activities?
*4. Did it develop in them a spirit of inquiry and curiosity?
5. Has the trip had any final effect on student conduct and behavior?

* Special Emphasis

UNIT C - TOPIC 3

Plywood and veneers

LESSON OBJECTIVE:

To familiarize student with the grades, cores, handling, and storage of plywood and veneers.

STUDY ASSIGNMENT:

IMPORTANT STUDY FACTORS:

Plywood grades, cores, handling and storage.

REFERENCES:

Cabinet Making and Millwork, pp. 173 through 198 and 203 - 204.
Principles of Wood Working, pp 570, 576 - 580.
Carpenters, Unit 2, pp. 23 - 24.

WORK ASSIGNMENT:

California workbook: Answer questions on page 55.

INTRODUCTION TO NEXT LESSON:

Applications of plywood in building trades. Bring small samples of plywood to next class and explain how used.

CABINETMAKING AND MILLWORK

UNIT C - TOPIC 2

Plywood and veneers

LESSON OBJECTIVE:

To continue a complete knowledge of all kinds of plywood and veneers.

STUDY ASSIGNMENT:

IMPORTANT STUDY FACTORS:

Specialty plywoods: High and low desnity, Marine plywood, interior and exterior plywood, exterior siding, decking and flooring. Compare student samples from their shops.

REFERENCES:

Cabinet Making and Millwork, pp. 173 through 198 and 203 through 204.
Principles of Wood Working, pp. 570, 576 through 580.
Carpenters, Unit 2, pp. 23 through 24.

WORK ASSIGNMENT:

California Testbook: Page 49 and 50.

INTRODUCTION TO NEXT LESSON:

TOPIC:

Mouldings: Wood

LESSON OBJECTIVE:

Acquaint students with wood mouldings used in residential and commercial construction.

IMPORTANT STUDY FACTORS:

How to obtain obsolete patterns of mouldings.
Finishing, storing, shipping, and installation problems.
Grain selection.

REFERENCES:

California workbook, Part 1, Use references listed on page 54.
Also, A.W.I., page 43 through 51.

WORK ASSIGNMENT:

Name mouldings and trim used in classroom and shcool building.
Answer questions in California textbook, part 1, page 47.

TOPIC: 5

Adhesives and glueing

LESSON OBJECTIVE:

Provide apprentice with working knowledge of adhesives used in construction.

IMPORTANT STUDY FACTORS:

Identify waterproof and water soluble glues
Ready mixed
Power and water mix
Catalyst
Hot and cold

REFERENCES:

U.B.C.J., Unit 1, page 132
California workbook, Part 1, pages 56 through 57.
Cabinetmaking and Millwork, Dahl, pages 188 through 194.

WORK ASSIGNMENT:

California workbook, part 1, pages 57 through 58.
List glues used in apprentice's shops.

INTRODUCTION TO NEXT LESSON:

Methods of clamping and introduction to glueing machines

CABINETMAKING AND MILLWORK

TOPIC: 5

Adhesives and glueing, clamps, and presses

LESSON OBJECTIVE:

Acquaint apprentice with different pressing and clamping methods.

IMPORTANT STUDY FACTORS:

Discuss types of presses: pheumatic, screw, weight, wedge, and lever
Special equipment: heater bars, electronic, hot water, calrod unit

REFERENCES:

U.B.C.J. Millwork, Unit 4, pages 74, 75, and 111.
Cabinet and Millwork, Dahl, pages 49 through 56.

WORK ASSIGNMENT:

California test book part 1, pages 51 and 52

Note: Information regarding glueing machines is nonexistant. Instructor should search for manufacturer's brochures.

TOPIC: 6

Fastening and Holding Tools

LESSON OBJECTIVE:

STUDY ASSIGNMENT:

California Workbook, Part 1, pp. 76 and 77
Cabinetmaking and Millwork, Dahl, pp. 21-23 and 36-41
Principles of Woodworking, Holtrop, pp. 44-50

REFERENCES:

Principles of Woodworking, Holtrop
California Workbook, Part 1
Cabinetmaking and Millwork, Dahl

IMPORTANT STUDY FACTORS:

Kinds of Clamps: Bar, screw, belt, screw driver with screw holder, most commonly used clamps
Other fastening methods: Nails, screws, bolts, and joint fasteners

WORK ASSIGNMENT:

INTRODUCTION TO NEXT LESSON:

TOPIC: 7

Fastening and Holding Tools

LESSON OBJECTIVE:

STUDY ASSIGNMENT:

California Workbook, Part 1, pp. 76 and 77
Cabinetmaking and Millwork, Dahl, pp. 21-23 and 36-41
Principles of Woodworking, Holtrop, pp. 44-50

REFERENCES:

Principles of Woodworking, Holtrop
California Workbook, Part 1
Cabinetmaking and Millwork, Dahl

IMPORTANT STUDY FACTORS:

Kinds of Clamps: Bar, screw, belt, screw driver with screw holder, most commonly used clamps
Other fastening methods: Nails, screws, bolts, and joint fasteners

WORK ASSIGNMENT:

INTRODUCTION TO NEXT LESSON:

MILLWORK AND CABINETMAKING

UNIT C - TOPIC 8:

Abrasives and Sanding

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of the kinds of grits and backing on abrasive papers and cloths, and also the selection of the proper abrasive for each job.

STUDY ASSIGNMENT:

REFERENCES:

California Text, Part 1, Unit C, pp. 59-60

WORK ASSIGNMENT:

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT C - TOPIC 8:

Abrasives and Sanding - Grinders and Grinding Wheels

LESSON OBJECTIVE:

To present to the apprentice information that will contribute to a more intelligent use and a better understanding of grinders and grinding wheels.

STUDY ASSIGNMENT:

Getting the Most Out of Your Abrasive Tools, pp. 5-8; 16, 17, 35 and 40

REFERENCES:

Getting the Most Out of Your Abrasive Tools, Delta Manufacturing Division

IMPORTANT STUDY FACTORS:

1. Know how grits are graded.
2. Be able to tell what factors must be considered before selecting a grinding wheel for a job.
3. Be familiar with general safety while using a grinder and know how to use a tool rest and guides.
4. Be able to select the correct grinding wheel and determine the correct speed for a job.

WORK ASSIGNMENT: (complete the following statements)

1. A number 12 grit is so named because ______________________________ ______________________________.
2. The grit sizes considered in the medium category range from ____________ to ____________.
3. A good choice of a medium bond for a grinding wheel might be indicated by the letter ____________.
4. The five bits of information necessary to the ordering of a grinding wheel

UNIT C - TOPIC 8

Abrasives and Sanding - Grinding and Grinding Wheels (cont'd.)

WORK ASSIGNMENT: (cont'd.)

are: ______________, __________________, ____________________, ______________________, and ________________.

5. ________________ ________________ is to be preferred for the grinding of high tensile strength such as ____________ ____________, etc.

6. ____________________ wheels are used for grinding soft materials and ____________________ wheels are used for grinding hard materials.

7. For average work, a ________________ grade is ordinarily used.

8. Materials which tend to clog a grinding wheel should have the abrasive grains ________________ ________________.

9. Hard brittle materials require a wheel with ________________ spaced abrasive grains.

10. Cut-off wheels are generally bonded with: a. ______________________, b. ______________________, and c. ______________________.

11. A ________________________ aluminum oxide is best for grinding high speed steel.

12. Two safety suggestions relative to grinders are to wear ________________ and use ________________ ________________.

13. The tool rest should be set ______________________________________

14. Free hand grinding without a rest should be done on the ________________ quarter of the wheel where one can get a "drag" angle.

15. White aluminum oxide grinding wheels will permit a heavier ______________ without overheating.

16. In the appendix (page 40) study the chart at the top of the page and recommend a selection of grinding wheels to be used in sharpening chisels (wood), cutters (molding), drills, saws (grinding), high speed steel (grinding).

a. Chisels: ____

b. Cutters: ____

c. Drills: ____

CABINETMAKING AND MILLWORK

UNIT C - TOPIC 8

Abrasives and Sanding - Grinding and Grinding Wheels (cont'd.)

WORK ASSIGNMENT: (cont'd.)

d. Saws: ______________________________

e. High speed steel: ______________________________

17. Using the chart at the bottom of page 40: If a 10" wheel revolves at 1719 r.p.m., what will its surface speed be? ______________________________

18. If a 6" wheel revolves at 3501 r.p.m., what will its surface speed be? ______________________________. To attain a surface speed of 7500 s.f.m., how fast should an 8" wheel turn? ______________________________.

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT C - TOPIC 8

Abrasives and Sanding - Sanding: Belt, Drum, Duplex, and Portable

LESSON OBJECTIVE:

To provide the apprentice with an understanding of the use of all types of sanding machines so he can operate and maintain them efficiently and safely.

STUDY ASSIGNMENT:

1. Machine Woodworking, pp. 258-283
2. Woodworking Machines, pp. 114-123
3. Getting the Most Out of Your Abrasive Tools, Delta Manufacturing Division, pp. 5,6,9, 10-12, 13-15, and 31-32.

REFERENCES:

1. Machine Woodworking by Herman Hjorth
2. Woodworking Machines by Herman Hjorth
3. Getting the Most out of Your Abrasive Tools, Delta Manufacturing Division

IMPORTANT STUDY FACTORS:

1. Be able to explain the use of the various sanding machines.
2. Learn how to change paper on a drum sander.
3. Learn the advantage of an oscillating edge sander.
4. Learn how to sand molding on a belt sander.
5. Learn the type of work you would sand on a spindle sander.

WORK ASSIGNMENT:

1. An automatic stroker is an aluminum ______________________________ attached to a ______________________________ that slides on a steel track.
2. For sanding molding make a wooden sanding block to fit the ________________ of the molding.
3. A variety sander can be used both ____________________ and ________________.

UNIT C - TOPIC 8

Abrasives and Sanding - Sanding: Belt, Drum, Duplex, and Portable (cont'd.)

WORK ASSIGNMENT: (cont'd.)

4. The largest drum sanders have from ____________ to ______________ sanding drums and are from ___________ to _____________ feet wide.

5. A floor sander is another type of _____________________.

6. On a variety sander the stock to be sanded is held on the __________________.

7. Spindle sanders are usually _______________________.

8. An edge sander is a belt sander with the belt in a _________________________ position.

9. The ______________________ portable sander is the one most commonly used.

10. The principal parts of a disk sander are ________________ or _______________ disk, _______________, ____________________ and ________________________.

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT C - TOPIC 9

Lumber Substitutes (Composition and Pressed Board)

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of the kinds of lumber and lumber substitutes.

STUDY ASSIGNMENT:

Cabinet and Millwork by Dahl and Wilson, pp. 163 - 172.
Principles of Woodworking by Holtrop and Hjorth, pp. 117 - 128 and 514 - 515.

REFERENCES:

California Text, Part 1, Unit C., Topic 2, pp. 51 - 52.
Principles of Woodworking, above pages under study assignment.

WORK ASSIGNMENT:

Kinds of Lumber
Types of Lumber
Grades of Lumber
Characteristics of Wood
Shrinkage of lumber

INTRODUCTION TO NEXT LESSON:

Lumber and Lumber Substitutes

(Note: Three 4-hour class sessions alloted to this topic.

UNIT C - TOPIC 9 Continued

Lumber Substitutes (Composition and Pressed Board)

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of the kinds of lumber and lumber substitutes.

STUDY ASSIGNMENT:

Tools, Materials, Ethics, and History of the Trade by United Brotherhood of Carpenters, pp. 117-128.

REFERENCES:

California Text, Part 1, Unit C, Topic 2, pp. 51-52.
Tools, Materials, Ethics, and History of the Trade, pp. 117-128.

WORK ASSIGNMENT:

Bring samples of wood from shop
Study the samples of wood.
What kind of wood each apprentice has worked with.
Discuss the kinds of lumber and their strength, hardness, stiffness and density.

INTRODUCTION TO NEXT LESSON:

Lumber and lumber substitutes.

UNIT C - TOPIC 9 (continued)

Lumber Substitutes (Composition and Pressed Board)

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of the kinds of lumber and lumber substitutes.

STUDY ASSIGNMENT:

See page 03.09.18.01

REFERENCES:

California Text, Part 1, Unic C, Topic 2, pp. 51-52.
See page 03.09.18.01

WORK ASSIGNMENT:

Shrinkage of lumber.

INTRODUCTION TO NEXT LESSON:

TOPIC:

Mouldings and Metal Trim

LESSON OBJECTIVE:

STUDY ASSIGNMENT:

Cabinetmaking & Millwork, Dahl, pp. 306-31 and 3-35 & 36

REFERENCES:

Principles of Woodworking, Haltrop, pp. 305-318, 320-321, and 323-326
California Workbook, Unit 1, p. 61

IMPORTANT STUDY FACTORS:

Types of mouldings
Shapes of standard mouldings
Bring samples of metal trim.

WORK ASSIGNMENT:

INTRODUCTION TO NEXT LESSON:

MILLWORK AND CABINETMAKING

UNIT D - TOPIC 1

Construction of Frames and Types of Joints

LESSON OBJECTIVE:

To acquaint the apprentice with the most common types of joints used in detail millwork and give information concerning their construction and use.

STUDY ASSIGNMENT:

Read the Information Sheet for Lesson 22 and study thoroughly the two pages of details.

REFERENCES:

Information Sheet for Lesson 22

IMPORTANT STUDY FACTORS:

1. Learn which joints to use when gluing materials to required widths.
2. Know which joints to use if pieces with the grain at right angles are to be glued.
3. Be able to explain the difference between shoulder joints and mitered joints.
4. Be able to explain a coped joint.

WORK ASSIGNMENT:

1. Draw a free hand sketch of each of the 18 joints shown in the information sheet.
2. Make two joints, after the instructor has assigned the types to construct.

INTRODUCTION TO NEXT LESSON:

Note: Four 4-hour class sessions allotted to this topic.

UNIT D - TOPIC 1 Continued

Construction of Frames and Types of Joints

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of detail frames.

STUDY ASSIGNMENT:

Cabinetmaking (Mill), United Brotherhood of Carpenters, pp. 1-6-30-34.

REFERENCES:

A.W.I.
Cabinetmaking and Millwork, by Dahal & Wilson

WORK ASSIGNMENT:

Types of frames.
Frame design
How are frame parts laid out and constructed.

INTRODUCTION TO NEXT LESSON:

Construction of frames and types.

UNIT D - TOPIC 1 Continued

Construction of Frames and Types of Joints

LESSON OBJECTIVE:

To show the apprentice the different types of frames and their construction

STUDY ASSIGNMENT:

See page 04.01.23.01

REFERENCES:

See page 04.01.23.01

WORK ASSIGNMENT:

How is the frame for a sliding door constructed?
What kind of frames has the apprentice worked on in his shop?
How does the construction of a door sill differ from window sill?
How are window frames constructed?

INTRODUCTION TO NEXT LESSON:

Construction of frames and types.

CABINETMAKING AND MILLWORK

UNIT D - TOPIC 1 Continued

Construction of frames and types of joints.

LESSON OBJECTIVE:

See page 04.01.23.01

STUDY ASSIGNMENT:

See page 04. 01.23.01

REFERENCES:

See page 04. 01.23.01

WORK ASSIGNMENT:

How to lay out window frames.
Talk about the different kinds of window and door frames.

INTRODUCTION TO NEXT LESSON:

MILLWORK AND CABINETMAKING

UNIT D - TOPIC 2

Safety

LESSON OBJECTIVE:

To impress safety shop practices

STUDY ASSIGNMENT:

Secure Wash. State Safety Inspector for talk with class. Discussion afterwards.

REFERENCES:

WORK ASSIGNMENT:

State Safety Inspector to talk to the class.

INTRODUCTION TO NEXT LESSON:

MILLWORK AND CABINETMAKING

UNIT D - TOPIC 3

Hanging Doors and Casework

LESSON OBJECTIVE:

To provide the apprentice with information required to place hardware in the correct position and do a better job of hanging doors.

STUDY ASSIGNMENT:

REFERENCES:

1. Builders Finishing Hardware by National Retail Lumber Dealers Ass'n.
2. Suggested Unit Course in Interior and Exterior Trim by Delmar Publishers

WORK ASSIGNMENT:

Complete the following statements:

1. Locks may be classified according to ______________________ ______________________ and ______________________.
2. Name four types of locks:
    a. ______________________
    b. ______________________
    c. ______________________
    d. ______________________
3. Name four types of butt hinges:
    a. ______________________
    b. ______________________ c. ______________________
    d. ______________________
4. When hanging doors allow a clearance of about ____________ on sides and top.
5. For lip doors an ____________ hinge is used.
6. Doors 1 3/8" thick require no ____________ at the lock side.
7. Doors 1 3/4" thick require a ____________ of ____________ inches at the lock side.

8. It is best to fit the ____________ to the door in their proper locations first.

9. Put the hinges on so the loose pin is on ____________.

10. The surface of butts should not be above the surface of the ____________ or ____________.

11. Center of cylinder of lock should be ____________ to ____________ inches from the floor.

INTRODUCTION TO NEXT LESSON:

Note: three 4-hour class sessions alloted to this topic.

MILLWORK AND CABINETMAKING

UNIT D - TOPIC 3 (continued)

Hanging Doors and Casework

LESSON OBJECTIVE:

To show the apprentice the different types of hardware.

STUDY ASSIGNMENT:

REFERENCES:

A.W.I.

WORK ASSIGNMENT:

Types of hardware.

How much clearance should doors have.

INTRODUCTION TO NEXT LESSON:

Hanging doors and casework.

MILLWORK AND CABINETMAKING

UNIT D - TOPIC 3 (continued)

Hanging Doors and Casework

LESSON OBJECTIVE:

To provide the apprentice with information required to hang a door.

STUDY ASSIGNMENT:

Class discussion.

REFERENCES:

Class discussion.

WORK ASSIGNMENT:

Class discussion.

INTRODUCTION TO NEXT LESSON:

UNIT E - TOPIC 1

Measuring and Marking Tools

LESSON OBJECTIVE:

To acquire skill in operation and servicing.

STUDY ASSIGNMENT:

Use California Text, Part 1, Unit D, pp. 67-68.

REFERENCES:

Cabinetmaking and Millwork, by Dahl & Wilson, pp. 17-35.
Hand Woodworking Tools, by Delmar Publishers

WORK ASSIGNMENT:

How to sharpen different tools.
What hand tools are commonly used by the cabinetmaker.

INTRODUCTION TO NEXT LESSON:

Note: Four 4-hour class sessions allotted to this topic.

UNIT E - TOPIC 1 (continued)

Saws and Other Toothcutting Tools

LESSON OBJECTIVE:

To acquire skill in operation and sharpening

STUDY ASSIGNMENT:

See page 05.01.30.01

REFERENCES:

Use California Text, Part 1, Unit D, pp. 69-70

WORK ASSIGNMENT:

How to file a saw.

INTRODUCTION TO NEXT LESSON:

Hand tools' use, care and sharpening.

UNIT E - TOPIC 1 Continued

Edge Culling and Smoothface tools.

LESSON OBJECTIVE:

To acquire skill in operation and sharpening.

STUDY ASSIGNMENT:

Class discussion.

REFERENCES:

California Text, Part, 1, Unit D, pp. 71-73.

WORK ASSIGNMENT:

Why are quality tools important?
When is a block plane used?
When is a jointer plane used?
When is a rabbit plane used?

INTRODUCTION TO NEXT LESSON:

Hand tools' use, care, and sharpening.

UNIT E - TOPIC 1 (continued)

Boring and Drilling Tools

LESSON OBJECTIVE:

To acquire skill to operate and sharpen these tools

STUDY ASSIGNMENT:

Class Discussion

REFERENCES:

California Text, Part 1, Unit D, pp. 74-75

WORK ASSIGNMENT:

How to sharpen bits and drills.

INTRODUCTION TO NEXT LESSON:

MILLWORK AND CABINETMAKING

UNIT E - TOPIC 2

Year's Review

LESSON OBJECTIVE:

STUDY ASSIGNMENT:

REFERENCES:

WORK ASSIGNMENT:

INTRODUCTION TO NEXT LESSON:

MILLWORK AND CABINETMAKING

UNIT E - TOPIC 2 (continued)

Examination

LESSON OBJECTIVE:

STUDY ASSIGNMENT:

REFERENCES:

WORK ASSIGNMENT:

INTRODUCTION TO NEXT LESSON:

UNIT E - TOPIC 2 (continued)

Review of Examination

LESSON OBJECTIVE:

STUDY ASSIGNMENT:

REFERENCES:

WORK ASSIGNMENT:

INTRODUCTION TO NEXT LESSON:

ED 089019

MILLWORK AND CABINETMAKING

APPRENTICE-RELATED TRAINING

INSTRUCTOR'S MANUAL

2

2nd YEAR OF A
4-YEAR SERIES

U S DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

CE 001 058 (6)

VOCATIONAL EDUCATION
VE
COORDINATING
COUNCIL FOR
OCCUPATIONAL
EDUCATION
P. O. BOX 248
OLYMPIA, WASHINGTON
98501

MAY, 1971
P 71-61

COORDINATING COUNCIL FOR OCCUPATIONAL EDUCATION
OLYMPIA, WASHINGTON

LEGISLATION AFFECTING WORKERS

REVISED TO FEBRUARY 1, 1971

In recent years many laws have been passed on both federal and state levels that directly affect the working man, his family and dependents. In the apprentice training time available we cannot go into detail about all this legislation. In this lesson the highlights of the most important laws will be discussed. If an apprentice wishes to seek further detailed knowledge about any of them, he should contact his public library, one of the local offices indicated, his employer or his union. Included in this lesson are industrial insurance, unemployment compensation, old age and survivor's insurance, and wages and hours laws.

A. INDUSTRIAL INSURANCE (WORKMEN'S COMPENSATION ACT)

One of the purposes of the Workmen's Compensation Act is to afford to the worker certain and speedy relief in case of industrial accident. The purpose of this lesson is to reduce the law to simple and understandable terms, and to assist in promptly obtaining all the benefits of the Workmen's Compensation Act of the State of Washington. This information is general in nature, and is to serve as a guide in the situations which are most likely to arise under the Act.

1. Workers covered: Generally speaking, all employees engaged in manual labor are automatically covered. Deductions which are automatically made from salary or wages for medical aid (this should not be confused with health coverage as it requires the consent of employee) are proof of coverage by Workmen's Compensation Act. However, employees may be covered without deductions for medical aid being taken from their salary or wages if the employer chooses to absorb these premiums rather than charge them to the employee.

With the approval of their employer, employees who are not otherwise covered may obtain coverage. Such coverage must, of course, be obtained prior to the injury for which a claim is to be made. Forms and information may be obtained from any Service Location of the State Department of Labor and Industries or from the main office in Olympia.

2. How the Workmen's Compensation Act is financed: The premiums for medical benefits, called medical aid premiums, are paid one-half by the employer and one-half by the employee through payroll deductions. It is not unlawful, however, for the employer to absorb the entire medical aid premium and not charge any part of it to the employee.

The premiums for compensation benefits, including monthly compensation for loss of time from work and all disability awards and pensions (called industrial insurance premiums) are paid entirely by the employer. It is unlawful for the employer to charge or deduct from wages or salary any part of such premiums.

Rights to compensation and medical care are not affected by any other insurance which the employee may have. Employees can accept any benefits to which they may be entitled under any other type of insurance and in addition thereto be entitled to receive full industrial insurance benefits from the Department of Labor and Industries.

Payment cannot be reached by creditors through garnishment, execution or attachment until such time as the warrant covering such payment has actually been delivered to the employee by the Department of Labor and Industries.

3. Industrial insurance benefits:

a. Medical benefits include doctor, hospital and nursing care, including x-rays and drugs prescribed by your attending physician, glasses, dental repairs and dentures, artificial appliances, eyes and limbs, where necessary because of an industrial injury or occupational disease.

b. Compensation for loss of time from work is not paid for the day of injury or the three days following said injury, unles the disability continues for 30 or more consecutive calendar days from date of injury. If employer continues to pay full wages or salary, by other than vacation pay, the employee is not entitled to receive monthly time loss compensation. If employee returns to work before his claim is closed and is unable to earn full previous wage or salary due to injury, he will receive the proportionate share of monthly time loss compensation. Scheduled rate of compensation payments for injuries occurring on or after August 6, 1965, are as follows:

SINGLE	$ 185.00
MARRIED	215.00
MARRIED with ONE child under 18 years	252.00
MARRIED with TWO children under 18 years	283.00
MARRIED with THREE children under 18 years	306.00
MARRIED with FOUR children under 18 years	329.00
MARRIED with FIVE children under 18 years	352.00

Payment of monthly time loss compensation has no relationship to whetherthe claimant is receiving vocational rehabilitation services, but is allowed only when his condition, due to his injury, prevents him from working and is not yet medically fixed. Rate of compensation is governed by the law in effect on the day of the injury.

c. Compensation for permanent partial disability: Lump sum award for injury which causes some permanent partial disability but which does not prevent worker from resuming some gainful occupation. Amount of compensation to which employee is entitled is based on certain schedules which are set forth in the law. Awards vary from $270.00 for loss of little finger at distal joint to $15,000.00 for loss of arm or leg at shoulder of hip joint.

d. Compensation for permanent total disability: Provision is made for a pension to a totally permanently disabled worker (added payments for children under 18 years) and pension thereafter to his widow. A total permanently disabled worker is one whose injury completely and permanently disables the worker from regularly following a gainful occupation. A single worker's monthly compensation is $185.00, a married worker's $215.00, a widow with or without minor children $140.00, the youngest child $37.00, next youngest $31.00, each additional child $23.00 (for a maximum of five children.)

e. Compensation for fatal injuries: Provision is made for a pension for widow or invalid widower and for minor children of a worker killed in an industrial accident. The widow or invalid widower would receive $140.00 per month, the youngest child $37.00, the next youngest child $31.00, each additional child $23.00, with maximum for the family $277.00.

4. Ten commandments for injured workmen:

1. Immediately upon the occurrence of an injury give notice of such injury, regardless of how trivial it may appear to be. Report to the person designated by the employer to receive notice of accidents.

2. As soon as employee is physically able he should fill out Report of Accident (or Report of Occupational Disease), at the doctor's office of the hospital. This report should be left with the doctor.

3. After employee has completed his part of the Report of Accident and left it with the doctor, he should check to see that the report is completed by the doctor and mailed to the employer.

4. After four weeks from the signing of the Report of Accident, if some word or acknowledgement has not been received, check with the employer to see if report was received by him from the doctor, acted upon, and turned in to the Department of Labor and Industries.

5. After six weeks, if still no acknowledgment has been received, advise the Department of Labor and Industries through a Service Location or by writing directly to the main office in Olympia, giving name and address of employer, the doctor, nature of injury, and the date of injury. No action can be taken until report is filed.

6. As soon as possible employee should get the names and addresses of all witnesses who saw the accident or who have knowledge concerning the same and have such information available if there is an investigation of the claim.

7. While employee is off work, he will receive each month a postal card, called a "certificate of disability", containing portions to be filled in by the doctor and by the workman. This card should promptly be filled in by both doctor and employee and returned to the Department of Labor and Industries. Payment cannot be made for loss of time from work until this card is returned.

8. Read all communications from the Department of Labor and Industries and follow carefully all instructions.

9. After an award of compensation has been made to the employee (or other final action taken, such as rejection) which he believes to be incorrect or unlawful, he must apply for reconsideration within sixty days after receipt of printed order.

10. After a claim is closed, application for further compensation or treatment can be made providing that employee's condition has become worse since the closing of the claim. Such application must be filed with the Department of Labor and Industries within five years from the date of the closing order.

5. Filing limitations: A workman loses his rights, irrespective of the merits of his claim, unless he meets certain deadlines for filing necessary reports and applications with the Department of Labor and Industries. These limitations are as follows:

Time limit for filing of claim: 1 year after the day upon which the injury occurred.

Time limit for protest or request for reconsideration of an order of the Department must be received by the Department within 60 days from date of receipt of the order. This also applies to appeals to the Board of Industrial Insurance Appeals which is a separate agency composed of a representative from labor, one from management and one from the general public.

Time limit for appealing to court from the Board of Insurance Appeals final order: 30 days.

Time limit for requesting reopening of claim: 5 years

NOTE: Information regarding Industrial Insurance was taken from a pamphlet entitled: "Reference Manual Relative to Benefits Under Workmen's Compensation and Medical Aid Acts, State of Washington" and published by the Department of Labor and Industries of the State of Washington. For copies of this manual and for additional information contact any of the following Service Locations or the Department of Labor and Industries:

Aberdeen
Bellingham
Bremerton
Ephrata
Everett
Kennewick
Longview
Mount Vernon
Port Angeles
Seattle
Spokane
Tacoma
Vancouver
Wenatchee
Yakima

B. UNEMPLOYMENT COMPENSATION

Under the Federal-State system of unemployment compensation, established under the Federal Social Security Act and the Washington State Employment Security Act, there has been developed the particular program that seems best adapted to conditions prevailing within this state. It is important that apprentices know the details of the employment security program and understand how it functions.

1. Who is covered? In the State of Washington a worker in any firm employing one person at any time is covered by the plan, unless specifically excluded such as: agricultural labor, domestic service in private homes, service for relatives, and self-employment including agents on commission.

2. How is the program financed? This state finances unemployment benefits mainly by contributions from employers on the wages of their workers. There is no tax on employees or deduction from wages. The funds collected are held for the state in the unemployment trust fund (at interest) in the United States Treasury. From this fund, money is drawn to pay benefits. The maximum rate for employer contribution is 2.7% of wages paid, limited to the first $4,200.00 earned by each worker within a calendar year. Congress makes appropriations for the cost of administration of this Federal-State program.

3. How does one qualify for benefits?

a. You must be unemployed to the extent that your earnings are less than your benefits would be for total unemployment.

b. You must have earned not less than $1100 in the first four of the last five completed calendar quarters prior to the quarter in which you file the initial claim for benefits. (The qualifying amount is adjusted annually.)

c. You must register for work with the Employment Service.

d. You must file a claim for benefits (by mail if necessary) and must serve one "waiting week" during which you are not employed.

e. You must be actively seeking work, be physically able to work, and immediately available for work.

f. You must report each week in person unless directed otherwise by the person taking your claim.

4. What are the benefits? The amount of your benefits is determined by your earnings during the four-quarter period mentioned in 3 b. That four-quarter period is called the base year.

5. What will cause one to become disqualified?

a. Failure to apply for available suitable work or refusal to accept suitable work without good cause disqualifies for benefits from the date of such failure or refusal and until the individual returns to work and earns an amount equal to his weekly benefit amount in each of five calendar weeks.

b. Voluntarily quitting work without good cause disqualifies for benefits for that week and for the next ten weeks.

c. Being discharged or suspended for misconduct connected with your work disqualifies for benefits for that week and for the next ten weeks.

d. Knowingly withholding a material fact or making a misrepresentation or false statement in order to obtain benefits disqualifies for benefits for that week and for an additional 26 weeks whenever a claim is filed after being thus disqualified. Criminal prosecution is also a possibility.

e. Being out of work because of labor and management disputes, generally speaking, disqualifies for benefits.

6. Can one appeal a determination of disqualification? An appeal in writing submitted within ten days of the mailing or personal delivery of a notice of disqualification, and delivered to the State Employment Security Office or a local office, will be considered first by an examiner of the department. A second appeal will be heard and determined by the Employment Security Commissioner. Following this, appeal may be made to the courts.

7. Administration. In this state unemployment compensation is administered through the Employment Security Department of the State government. Its executive officer is the Commissioner, who appoints nine members to a state advisory council (3 employers, 3 employees, 3 public). The state council shall aid the agency in formulating policy and discuss problems related to the administration of the unemployment insurance act and assure impartiality and freedom from political influence in the solution of such problems. All employees of the department, except policy-making heads, are appointed on a merit basis.

Information taken from:

Comparison of State Unemployment Insurance Laws as of July 6, 1969, published by the United States Department of Labor, Bureau of Unemployment Security, and

Unemployment Compensation Information for Claimants SF 8139 (Rev. 11-70)

C. SOCIAL SECURITY (Old Age Survivors Insurance)

The social security act was established by Congress in 1935, at which time the Social Security Board consisting of three members nominated by the President and confirmed by the Senate was established to administer the program of old age and survivors insurance for industrial and commercial workers and their dependents.

The President's reorganization plan No. 2, effective July 6, 1946, abolished the three-member Social Security Board and transferred its functions, as well as certain other federal functions, to the Federal Security Administrator, head of the Federal Security Agency, of which the Social Security Board was a part. On that date the Social Security Administration was established, with the former Chairman of the Board as Commissioner for Social Security.

On April 11, 1953, the Department of Health, Education and Welfare was established with the Social Security Administration as a component of that department. Within the Social Security Administration are four bureaus: Bureau of Old-Age and Survivors Insurance; Bureau of Public Assistance; Children's Bureau; Bureau of Federal Credit Unions.

The Social Security Act has been amended several times since its original passage. As a result, monthly benefits may be paid to the families of retired, disabled, or deceased workers, as well as to the retired or disabled person himself. The benefit amounts have been materially increased over the years until now the minimum benefit amount is $64.00 and the maximum is $434.40 a month on any one social security account. The benefit amounts are subject to fluctuation and current amounts can be ascertained by inquiry at any Social Security Administration office or from their publication SSI-35. Coverage has been extended so that now over nine out of every ten persons earning a living are covered under the program. The following summary describes the old-age, survivors and disability insurance program including the amendments of 1970.

1. Benefits payable to:

a. Retired worker age 65 or woman worker age 62.

b. Wife of retired worker if she is age 62 or over, or regardless of age if entitled child under 18 or adult disabled child is present. Dependent husband* of retired worker if he is age 65 or over.

c. Widow or dependent widower,* age 62 or over, of deceased worker.

d. Children (under age 18) of retired worker, and children of deceased worker and their mother (the worker's widow, or in some cases his divorced wife) regardless of her age. Adult disabled children qualify as though they were under age 18.

e. Dependent parents,* age 65 for father, 62 for mother, or over, of deceased worker.

f. In addition, a lump sum payment upon death of an insured worker.

* Proof of dependency must, in general be filed within two years of worker's entitlement in cases of a dependent husband, and within two years of death in cases of a dependent widower or dependent parent.

2. Insured status:

a. Based on "quarters of coverage." An individual paid $50 or more of non-farm wages in a calendar quarter is credited with a quarter of coverage for the quarter. ($7800 of wages in a year automatically gives four quarters of coverage.) An individual paid $100 or more of farm wages in a year is credited with one quarter of coverage for each full $100 of such wages ($400 or more of such wages automatically gives four quarters of coverage.) An individual with creditable self-employment income in a year (in general, $400 or more) automatically receives four quarters of coverage.

b. Fully insured status gives eligibility for all benefits except dependent husband's benefits and dependent widower's benefits, which require both fully and currently insured status, and child's benefits in respect to a married woman which may be payable only if she has currently insured status. A fully insured person is one who at or after attainment of retirement age, onset of disability, or death fulfills any one of the following three alternative requirements:

1. Has 40 quarters of coverage.

2. Has at least 6 quarters of coverage and at least one quarter of coverage (acquired at any time after 1936) for every two quarters elapsing after 1950 (or age 21, if later) and before retirement age, onset of disability, or death.

3. Has a quarter of coverage in all but four of the quarters after 1954 (but not including the quarter in which he attains retirement age, becomes disabled or dies.)

Most persons who become fully insured will go under the first or second alternatives. The second alternative enables a person who attained retirement age after July 1954 to become fully insured with just six quarters of coverage acquired at any time. Elderly persons who are newly covered under the 1954 or 1956 Amendments may meet the third alternative even though not the second. The third alternative is not effective in any case for persons reaching age 65 or dying after September, 1960.

c. Currently insured status (eligible only for child, mother, and lump-sum survivor benefits; necessary for husband's and widower's benefits) requires 6 quarters of coverage within 13 quarters preceding death or entitlement to old-age benefits.

3. Primary insurance amount:

a. The primary insurance amount is the amount paid to the retired or disabled worker. It is derived from the insured person's average monthly earnings. For those now qualifying for benefits for the first time, average monthly earnings are determined by dividing all covered earnings by all months after December 31, 1936, December 31, 1950, or the last day of the year in which a person reaches age 21, if that date is later than January 1, 1951. The closing date for figuring this average monthly earnings figure is ordinarily the first day of the year in which the person becomes disabled,files his application after reaching retirement age, or dies. As many as five years of the lowest earnings can be dropped out of this computation.

b. The minimum retirement benefit is $64.00 a month and the maximum is $250.70.

c. If a woman elects to receive her benefits starting at age 62 rather than waiting until 65, her payment will be reduced by 20%.

4. Benefits Amounts for Dependents and Survivors, Relative to Worker's Primary Insurance Amount:

a. Wife or dependent husband--one-half of primary. (Wife's benefit will be reduced by 25% if she files at age 62.)

b. Widow or dependent widower--three-fourths of primary.

c. Child--one-half of primary, except that for deceased worker's family, an additional one-quarter of primary is divided among the children.

d. Dependent parent--three-fourths of primary.

e. Lump-sum death payment--three times primary, with $255 maximum.

f. Maximum family benefit is $434.40.

g. Minimum amounts payable to any survivor beneficiary where only one is receiving benefits is $38.90.

h. For examples of monthly payments beginning January 1, 1970, see pamphlet publication of the U. S. Department of Health, Education and Welfard, Social Security Administration SSI-35, May, 1970.

5. Employment permitted without suspension of benefits (Called "Work Clause" or "Retirement Test"):

A beneficiary can earn $1680 in a year in any employment, covered or noncovered, without loss of benefits. In no case, however, are benefits withheld for any month in which the beneficiary's remuneration as an employee was $140 or less and in which he rendered no substantial services in self-employment. For beneficiaries age 72 or over, there is no limitation. If a retired worker's benefit is suspended, so also are the benefits of his dependents.

6. Covered employment:

a. All employment listed below which takes place in the 48 states, the District of Columbia, Alaska, Hawaii, Puerto Rico, or the Virgin Islands, or which is performed outside the United States by American citizens employed by an American employer, (or, by election, by an American citizen employed by a foreign subsidiary of an American employer) is covered employment. Also covered, under certain conditions, is employment on American ships and aircraft outside the United States.

b. Individuals engaged in the following types of employment are covered:

1. Virtually all employees in industry and commerce, other than long-service railroad workers (the service of those who retire or die with less than ten years of railroad service is covered.)

2. Farm and nonfarm self-employed with $400 or more of net earnings from covered self-employment.

3. State and local government employees not covered by a retirement system, and those covered by a retirement system on a referendum basis in which a majority of those eligible to vote are in favor of coverage; in any event, the State must elect such coverage.

4. Nonfarm domestic workers (based on $50 in cash wages from one employer in a quarter.)

5. Farm workers, including farm domestic workers (based on $150 or more in cash wages from any one employer in a year.)

6. Ministers and members of religious orders (other than those who have taken a vow of poverty) either employed by non-profit institutions (in positions which only a minister can fill) or self-employed are covered on individual elective basis as self-employed. Other employees of non-profit institutions are covered on elective basis; employer must elect coverage, and at least two-thirds of employees must concur in coverage (then all employees concurring in coverage and all new employees are covered).

7. Federal employees who are not now covered by retirement system established by law of the United States other than a few specifically excluded small categories.

8. Definition of "employee" is broadened from strict common-law rule to include following groups as "employees"; full-time wholesale salesmen; full-time life insurance salesmen; agent-drivers and commission drivers distributing meat, vegetable or fruit products, bakery products, beverages (other than milk), or laundry or dry cleaning services; and industrial homeworkers paid at least $50 in cash during a quarter and working under specifications supplied by employer.

9. Members of the Armed Forces.

7. Wage credits for World War II and subsequent military service:

World War II veterans and those in service thereafter (including those who die in service) are given wage credits of $160 for each month of active military (including naval) service in World War II and thereafter through December, 1956, except that credit is not given if service is used for any other Federal retirement or survivor system (other than compensation or pensions payable by the Veterans Administration); additional cost is to be borne by trust fund.

8. Maximum annual wage and self-employment income for benefit and contribution purposes:

$4800 per year for 1959 and after ($4200 in 1955-58, $3600 in 1951-54 and $3000 before 1951). $6600 in 1966-67, $7800 in 1968-____.

9. Tax (or contribution) rates:

a. 2-1/4% on employer and 2-1/4% on employee through 1958, 2-1/2% for 1959, 3% for 1960-62, 3-1/2% for 1963-65, 4.2% for 1966, 4.4% for 1967-68, 4.8% for 1969-70, 5.2% for 1971-____.

b. For self-employed the rate is 1-1/2 times that for employees. Self-employment income taxed is, in general, net income from trade or business; special optional provisions based on 50% of gross income are available for farmers with low net income.

c. No provisions for authorizing appropriations from general revenues to assist in financing the program.

For further information contact one of the 13 district Social Security offices in the following Washington cities. The offices are listed in local phone books under "United States Government, Health, Education and Welfare, Dept. of."

Aberdeen
Bellingham
Bremerton
Everett
Lewiston, Idaho
Olympia
Seattle
Spokane
Tacoma
Vancouver
Walla Walla
Wenatchee
Yakima

D. FEDERAL WAGE AND HOUR LAW

The Fair Labor Standards Act of 1938, known as the Federal Wage and Hour Law, was approved by the President on 25 June, 1938, and became effective 24 October 1938. This legislation is one of the most important labor measures adopted in recent years,for it seeks to correct and to eliminate as rapidly as possible in industries engaged in interstate commerce or in the production of goods for interstate commerce, or enterprises with an annual dollar volume in excess of $250,000, labor conditions detrimental to the maintenance of minimum standards of health, efficiency and general well-being.

The Law creates a Division of Wages and Hours within the Department of Labor under the direction of an administrator appointed by the President by and with the advice of the Senate.

The Fair Labor Standards have been amended, the latest effective February 1, 1967, providing the following standards: A minimum wage of $1.60 an hour; time and one-half pay for overtime after 40 hours (except where otherwise specially provided); a minimum age of 14 years for general employment (except for occupations declared hazardous and certain occupations outside of school hours).

The child labor provisions of the law prohibit producers, manufacturers, and dealers from shipping through interstate commerce, goods produced in an establishment in which within 30 days prior to shipment oppressive child labor has been used. The term "oppressive child labor" applies to employees under the age of 14 years in any occupation or employees between the ages of 16 and 18 in any occupation which has been found and declared by the Children's Bureau to be particularly hazardous for children or detrimental to their health and well-being.

Farm workers, newspaper delivery boys, employees in small (under $250,000) retail and service establishments, employees of street,suburban, interurban electric railway or motor bus carriers, seamen, and persons employed in bona fide executive, administrative, and professional capacities are exempt from both the wage and hour provisions of the law.

The act has conferred broad investigatory powers on the Administrator as to wages, hours and other conditions and practices of employment in any industry subject to the act. He may utilize the services of the bureaus and divisions of the Department of Labor for necessary investigations and inspections, as well as the services of the State and local agencies. The Administrator is empowered to order employers to maintain adequate records on wages and hours.

The law provides that any person wilfully violating the Act is subject to a fine and imprisonment. However, no penalty or imprisonment may be imposed for a first offense. An employer violating the hour or wage provisions of the Act may be liable to his employees for twice the difference between the wage received and the legal minimum wage, and also for any unpaid overtime compensation.

For further information see "Handy Reference Guide to the Fair Labor Standards Act" and CL 101, or Fair Labor Standards Act of 1938 as Amended, U.S.D.L. Publication 1167.

- - - - - - -

NOTE: Instructors should be alert to legislative changes affecting the worker. References below are to sources of information in the several departments and their informative manuals which are kept up to date and available at the listed locations.

A. Reference Manual relative to benefits under the Workmen's Compensation and Medical Aid Acts

State Industrial Insurance Office
State Administration Building, Olympia, Washington

B. Unemployment Compensation Information for Claimants S.F. 8139 (Rev. 11-70)

Employment Security Building, Room 417
Olympia, Washington

C. Your Social Security SSI-35

Social Security Administration
1007 South Washington Street
Olympia, Washington

D. The Construction Industry Under Fair Labor Standards Act W.H. 1310 Oct. 70

Regulations - Labor Standards Provisions WHPC #1244

Public Contracts Act - Rulings and Interpretations No. 3 - May 1963

U. S. Department of Labor
Smith Tower Building Room 1821
Seattle, Washington

MILLWORK AND CABINETMAKING

INDEX

SECOND YEAR - RELATED

UNIT	LESSON NO.	TOPIC	PAGE NO.
F	1 & 2	Cutoff and radial saws	06.01.01.01
	3 & 4	Jointer and planer	06.02.03.01
	5 thru 7	Boring machines, mortiser and tenoner	06.03.05.01
	8	Band, jig and sabre saws	06.04.08.01
	9 thru 12	Shaper and safety	06.05.09.01
	13 thru 15	Sharpening shaper knives and tool steel	06.06.13.01
	16 thru 18	Routers	06.07.16.01
	19 and 20	Automatic machinery	06.08.19.01
	21	Planers: setup and sharpening	06.09.21.01
	22	Circular saws and sharpening	06.10.22.01
	23	Moulder work	06.11.23.01
	24	Review of unit work	06.12.24.01
	25	Test	06.13.25.01
G	26 thru 30	Drawers	07.01.26.01
	31 thru 35	Plastic laminates	07.02.31.01
	36	Test	07.03.36.01

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 1

Cut-off and Radial Saws

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of the cut-off saw and radial saws

STUDY ASSIGNMENT:

Carpentry & Millwork, United Brotherhood of Carpenters, Chapter 8, p. 30

REFERENCES:

Carpentry & Millwork, United Brotherhood of Carpenters

IMPORTANT STUDY FACTORS:

Rockwell Manufacturing Co., Radial Saw, P.T. - 11

Carpentry & Millwork, U.B.C., Chapter 8, p. 30

WORK ASSIGNMENT:

Main structural features of cut-off saw.
What kind of machine work can be done on cut-off saws
How to level up saw
How to square up saw

INTRODUCTION TO NEXT LESSON:

How to remove saw blade
How to adjust saw blade and guard

Note: two 4-hour sessions allotted to this topic.

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 1

Cut-off and Radial Saws

LESSON OBJECTIVE:

To provide the apprentice with an understanding of the use of a radial saw

STUDY ASSIGNMENT:

Carpentry & Millwork, U.B. of C, Chapter 8, p. 30

REFERENCES:

IMPORTANT STUDY FACTORS:

Rockwell Manufacturing Company, Circular Saw, P.T.-8

WORK ASSIGNMENT:

How to remove saw blades

How to adjust saw blades and guard

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 2

Joiner and Planer

LESSON OBJECTIVE:

To provide the apprentice with information so that he will understand the use and safely

STUDY ASSIGNMENT:

REFERENCES:

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

How to edge and face plane on the jointer
How to rabbit on the jointer
How to taper on the jointer

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 2

Jointer and Planer

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of jointer and planer

STUDY ASSIGNMENT:

Carpentry & Millwork, U. B. of C., pp. 43-54

REFERENCES:

Carpentry & Millwork, U. B. of C.

IMPORTANT STUDY FACTORS:

Jointer and Planer Transparencies, 9-13, Rockwell Manufacturing Co.
Carpentry & Millwork, U. B. of C., pp. 43-54
Principles of Woodworking

WORK ASSIGNMENT:

How to operate the jointer safely
How to change knives
How to grind straight knives
How to operate the planer

INTRODUCTION TO NEXT LESSON:

How to use the jointer and planer
(Note: 2-4 hour class sessions allotted to this topic.)

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 3

Boring Machine, Mortiser, and Tenoner

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge and necessary information regarding the operation of the machines.

STUDY ASSIGNMENT:

Carpentry & Millwork, pp. 86-88
Principles of Woodworking, pp. 91-100

REFERENCES:

Carpentry & Millwork, U. B. of C.
Principles of Woodworking by Holtrop & Hjorth

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

How to set up and operate the vertical hollow-chisel mortiser
How to set up and operate the tenoner
Learn the safety of the machines

INTRODUCTION TO NEXT LESSON:

Learn the various types of boring tools used for wood

(Note: Three 4-hour class sessions allotted to this topic.

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 3

Boring Machine, Mortiser, and Tenoner

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of the various types of boring tools used for wood

STUDY ASSIGNMENT:

Carpentry & Millwork, U. B. of C., pp. 86-88
Principles of Woodworking by Holtrop & Hjorth, pp. 91-100

REFERENCES:

Carpentry & Millwork, U. B. of C, pp. 86-88
Principles of Woodworking by Holtrop & Hjorth, pp. 91-100

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Identify the parts of a hollow-chisel mortiser
Identify the parts of a tenoner

INTRODUCTION TO NEXT LESSON:

Learn how to operate and how to maintain a tenoner

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 3

Boring Machine, Mortiser, and Tenoner

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge and understanding of the use of a tenoner.

STUDY ASSIGNMENT:

Carpentry & Millwork, U. B. of C., pp. 86-88
Principles of Woodworking, pp. 91-100

REFERENCES:

Carpentry & Millwork, U. B. of C.
Principles of Woodworking, pp. 91-100

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Learn all the setups that can be made on a tenoner.

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 4

Band, Jig, and Sabre Saws

LESSON OBJECTIVE:

To provide the apprentice with an understanding of the operation and maintenance of a band saw and jig saw

STUDY ASSIGNMENT:

Cabinetmaking and Millwork, California Workbook, pp. 34-36
Carpentry & Millwork, U. B. of C., pp. 32-42

REFERENCES:

Cabinetmaking and Millwork, California Workbook, pp. 34-36
Carpentry & Millwork, U. B. of C., pp. 32-42-
"Getting the Most out of Your Band and Scroll Saw," pp. 5-43

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

How to Use the Bandsaw safely
How to Fold a bandsaw blade
How to adjust and track a band saw
How to do production sawing of segments and discs on the bandsaw
How to do pattern sawing on the band saw
How to do pad assembly and mass cutting
Be able to describe the band and jig saw and their various parts

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 6

The Shaper and Safety

LESSON OBJECTIVE:

To provide the apprentice with an understanding of the correct way to run a shaper and sharpen the knives

STUDY ASSIGNMENT:

Carpentry & Millwork, U. B. of C., pp. 59-74
Rockwell Manufacturing Co., PT. 14

REFERENCES:

Carpentry & Millwork, U. B. of C., p. 59-74
Rockwell Manufacturing Co.

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

How to operate the shaper safely
How to lay out a pattern for cutter knives
How to grind cutter knives

INTRODUCTION TO NEXT LESSON:

Learn the correct bevel to put on a knife

(Note: Four 4-hour class sessions allotted to this topic.)

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 6

Shaper and Safety

LESSON OBJECTIVE:

To provide the apprentice with an understanding of the correct way to run a shaper and sharpen the knives

STUDY ASSIGNMENT:

Carpentry & Millwork, U. B. of C., pp. 59-74
Rockwell Manufacturing Co., PT 14

REFERENCES:

Carpentry & Millwork, U. B. of C.
Rockwell Manufacturing Co.

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

How to set up open-face knives in a shaper
How to cut straight moulded edges on the shaper
How to set up the adjustable fence on the shaper
How to shape against the collar on the shaper

INTRODUCTION TO NEXT LESSON:

Learn how to make shaper knives

UNIT F - Topic 6

Shaper and Safety

LESSON OBJECTIVE:

To provide the apprentice with an understanding of the correct way to run a shaper and sharpen the knives.

STUDY ASSIGNMENT:

Carpentry & Millwork, U. B. of C., pp. 59-74
Rockwell Manufacturing Co., Pt. 14

REFERENCES:

Carpentry & Millwork, U. B. of C.
Rockwell Manufacturing Co., Pt. 14

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

How to shape with outline patterns on the shaper
How to shape segment and circular work on the shaper
How to shape with forms on the shaper

INTRODUCTION TO NEXT LESSON:

Learn the importance of balanced knives

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 6

Shaper and Safety

LESSON OBJECTIVE:

To provide the apprentice with an understanding of the correct way to run a shaper.

STUDY ASSIGNMENT:

Carpentry & Millwork, U. B. of C., pp. 59-74
Rockwell Manufacturing Company, Pt. 14

REFERENCES:

CARPENTRY & MILLWORK, U. B. of C.
Rockwell Manufacturing Company, Pt. 14

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

How to plane with the shaper
How to make the glue joint on the shaper for glue-ups
How to stick and cope for doweled sash and doors on the shaper
How to use jigs and fixtures with the shaper

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 6

Sharpening: Shaper Knives and Tool Steel

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of how to sharpen shaper knives.

STUDY ASSIGNMENT:

Carpentry & Millwork, U. B. of C., pp. 60-61

REFERENCES:

Carpentry & Millwork, U. B. of C.

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Learn how to get the correct rake angle of a knife
Learn the correct bevel to put on a knife

INTRODUCTION TO NEXT LESSON:

Sharpening shaper knives

(Note: Three 4-hour class sessions allotted to this topic.)

UNIT F - TOPIC 6

Sharpening: Shaper knives and Tool Steel

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of how to sharpen shaper knives.

STUDY ASSIGNMENT:

Carpentry & Millwork, U. B. of C., pp. 60-61

REFERENCES:

Carpentry & Millwork, U. B. of C

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Learn the importance of balanced knives
Learn how to make shaper knives

INTRODUCTION TO NEXT LESSON:

Sharpening shaper knives

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 6

Sharpening: Shaper knives and Tool Steel

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of how to sharpen shaper knives.

STUDY ASSIGNMENT:

Carpentry & Millwork, U. B. of C., pp. 60-61

REFERENCES:

Carpentry & Millwork, U. B. of C.

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Learn how to cut shaper steel

INTRODUCTION TO NEXT LESSON:

UNIT F - TOPIC 7

Routers

LESSON OBJECTIVE:

To provide the apprentice with an understanding of the use of a router so that he can operate and maintain the machine more efficiently.

STUDY ASSIGNMENT:

Cabinetmaking and Millwork, California, Part #2, pp. 37-38

REFERENCES:

Cabinetmaking and Millwork, California, Part 2

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Learn how to bore, mortise, and groove with the router
Learn how to trim, plastic laminate

INTRODUCTION TO NEXT LESSON:

Learn the router

(Note: Three 4-hour class sessions allotted to this topic.)

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 7

Routers

LESSON OBJECTIVE:

To provide the apprentice with an understanding of the use of a router so that he can operate and maintain the machine more efficiently.

STUDY ASSIGNMENT:

Cabinetmaking and Millwork, California, Part 2, pp. 37-38

REFERENCES:

Cabinetmaking and Millwork, California, Part 2

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Learn the various cutters use on router
Learn the speed of a modern router

INTRODUCTION TO NEXT LESSON:

Learn the router

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 7

Routers

LESSON OBJECTIVE:

To provide the apprentice with an understanding of the use of a router so that he can operate and maintain the machine more efficiently.

STUDY ASSIGNMENT:

Cabinetmaking and Millwork, California, Part 2, pp. 37-38

REFERENCES:

Cabinetmaking and Millwork, California, Part 2

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Be able to explain the difference between veining and fluting
Learn how to route with a template

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 8

Automatic Machinery

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of automatic machinery

STUDY ASSIGNMENT:

To be provided in class

REFERENCES:

To be provided in class

IMPORTANT STUDY FACTORS:

To be provided in class

WORK ASSIGNMENT:

Instructor to give lesson on automatic shapers, wood lathe, sander

INTRODUCTION TO NEXT LESSON:

Automatic saws

(Note: Two four-hour class sessions allotted to this topic.)

UNIT F - TOPIC 8

Automatic Machinery

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of automatic machinery

STUDY ASSIGNMENT:

To be provided in class

REFERENCES:

To be provided in class

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Instructor to give lesson on automatic table saw, automatic band saw, automatic edge bander

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 9

Planers: Set-up and Sharpening

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of the planers

STUDY ASSIGNMENT:

Cabinetmaking and Millwork, Workbook, California, Part 2, pp. 52-53
Carpentry and Millwork, U. B. of C, p. 58

REFERENCES:

Cabinetmaking and Millwork, Workbook, California, Part 2
Carpentry & Millwork, U. B. of C.

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Learn how to sharpen and set planer knives
Learn how to care for your planer
Learn how to operate the planer
Learn how to use the planer

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 10

Circular Saws -- Sharpening

LESSON OBJECTIVE:

To provide the apprentice with the theory and science necessary for him to intelligently maintain his own circular saws

STUDY ASSIGNMENT:

Carpentry and Millwork, U. B. of C., p. 9

REFERENCES:

Carpentry and Millwork, U. B. of C.

IMPORTANT STUDY FACTORS:

Carpentry & Millwork, U. B. of C

WORK ASSIGNMENT:

Learn the different kinds of circular saws
Learn the advantages and disadvantages of hollow-ground saws; also swaged tooth saws
Be able to lay out the proper hook on a common rip saw
Learn the proper method of filing a cut-off saw, planer saw, combination saw and dado head

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 11

Moulder Work

LESSON OBJECTIVE:

To provide the apprentice with an understanding of the use of a sticker and the reasons for certain technical operations to be mastered so that he can efficiently operate and maintain a sticker in a safe manner.

STUDY ASSIGNMENT:

Carpentry & Millwork, U. B. of C., p. 81-82

REFERENCES:

Carpentry & Millwork, U. B. of C.

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

How to apply proper operation procedures in moulding
How to put on and adjust the cutterheads in a moulder
Learn all you can about the different types of stickers

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 12

Review and Test of Machines

LESSON OBJECTIVE:

To determine the amount of knowledge an apprentice has retained from the previous lessons in this unit

STUDY ASSIGNMENT:

Review the references, if necessary

REFERENCES:

Cabinetmaking and Millwork, California, Workbook, Part 2
Carpentry & Millwork, U. B. of C, Principles of Woodworking by Holtrop and Hjorth

IMPORTANT ST[illegible]ORS:

Review and study all the lessons you have had.

WORK ASSIGNMENT:

Test on machines

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 12

TEST

Cut-Off and Radial Saw

1. The arm swings right and left for ______________ cutting.
2. The cut-off gage is used for cutting stock to ______________ length.
3. The saw guard should be on at ______________ times.
4. For grooving tilt the motor to ______________ vertical position.
5. The motor tilts right or left for ______________ cutting.

Variety Saw:

6. The HP for 8" variety saw should be ______________.
7. The clearance block is used for ______________.
8. The ______________ and ______________ should be used at all times.
9. A cross lap joint is cut with the ______________.
10. A slip joint is a through ______________ and ______________ joint.

Jointer:

11. To make a glue joint the outfeed table must be slightly ______________.
12. A kick may be caused by ______________ knives.
13. For octagonal cutting the stock to be used must be ______________ and ______________.

Planer:

14. The shortest stock than can safely be fed to the planer should be ______________ long.

Trim Saw:

15. This machine is used mainly for cutting stock to ______________.
16. The underswing cutoff saw is controlled with a ______________.

TEST (cont'd)

Boring Machine and Mortiser:

17. The hollow chisel is fastened to the ram and is ______________________.

18. The principal parts of a drill press are ____________________, ____________________, ____________________ and ____________________.

Tenoner:

19. The tenoning heads are ______________________ cutterheads.

20. The tenoning heads are adjustable independently both ____________________ and ______________________.

Band Saw and Jig Saw:

21. The saw guides consist of two ______________________.

22. Saber sawing is ______________________ than ordinary jig saw work.

Shaper:

23. Do not attempt to shape ____________________ pieces of wood.

24. A rule joint is used on tables with ____________________ leaves.

Router:

25. Dovetails are cut on a router with a ____________________ bit.

Sticker:

26. Each ______________________ is equipped with a chip breaker.

CABINETMAKING AND MILLWORK

UNIT F - TOPIC 6

Test REVIEW

LESSON OBJECTIVE:

To determine the amount of knowledge an apprentice has retained from the previous lessons in this unit

STUDY ASSIGNMENT:

All the topics that were studied

REFERENCES:

All the topics that were studied

IMPORTANT STUDY FACTORS:

Same as above

WORK ASSIGNMENT:

Test on all topics

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT G - TOPIC 1

Drawers

LESSON OBJECTIVE:

To give the apprentice a working formula for billing cabinet drawers

STUDY ASSIGNMENT:

To be provided in class

REFERENCES:

To be provided in class

IMPORTANT STUDY FACTORS:

To be provided in class

WORK ASSIGNMENT:

Instructor to give lesson on drawer building

INTRODUCTION TO NEXT LESSON:

Drawers

(Note: 5 4-hour class sessions allotted to this topic.)

CABINETMAKING AND MILLWORK

UNIT G - TOPIC 1

Drawers

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of how to make drawers

STUDY ASSIGNMENT:

To be provided in class

REFERENCES:

To be provided in class

IMPORTANT STUDY FACTORS:

To be provided in class

WORK ASSIGNMENT:

Instructor to give lesson on drawer building

INTRODUCTION TO NEXT LESSON:

Drawers

CABINETMAKING AND MILLWORK

UNIT G - TOPIC 1

Drawers

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of how to make drawers

STUDY ASSIGNMENT:

To be provided in class

REFERENCES:

To be provided in class

IMPORTANT STUDY FACTORS:

To be provided in class

WORK ASSIGNMENT:

Instructor to give lesson on making cutting bills and lay out to machine drawers

Be able to explain why the drawer fronts are machined with the back side to the fence. Learn why it is important to make as few setups as possible in machining drawers

INTRODUCTION TO NEXT LESSON:

Drawers

CABINETMAKING AND MILLWORK

UNIT G - TOPIC 1

Drawers

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of how to make drawers

STUDY ASSIGNMENT:

To be provided in class

REFERENCES:

To be provided in class

IMPORTANT STUDY FACTORS:

To be provided in class

WORK ASSIGNMENT:

(1) Bill out a lipped three-sides drawer for the following openings:
    A. 12" x 3" x 2"
    B. 13 1/8" x 3 5/8" x 20"
    C. 12 3/8" x 4 1/16" x 22"

(2) Bill out a lipped four-sides drawer for each opening
    A. 10" x 2 1/2" x 19"
    B. 8 3/4" x 3 3/4" x 12"
    C. 14 1/4" x 9 3/16" x 21 1/2"

(3) Bill out a flush-front drawer for each
    A. 11" x 7" x 18"
    B. 13 1/8" x 3 5/8" x 20"
    C. 8 3/4" x 3 3/4" x 12"

INTRODUCTION TO NEXT LESSON:

Drawers

CABINETMAKING AND MILLWORK

UNIT G - TOPIC 1

Drawers

LESSON OBJECTIVE:

To teach the apprentice the quickest and most accurate method of machining drawers

STUDY ASSIGNMENT:

Review the other lesson on drawers

REFERENCES:

Information on all sheets

IMPORTANT STUDY FACTORS:

Memorize each of the formulas your instructor has given you.

WORK ASSIGNMENT:

(1) Learn why it is important to be able to machine drawers fast and accurately.
(2) Be able to tell why the selection of material as to size and kind is important.
(3) Learn why extreme care must be taken in dressing and sizing material.
(4) Be able to give the reason for the proper clearance for a drawer.
(5) Learn the proper method of listing drawer openings.
(6) Be able to explain why it is necessary to use a special stop to cut drawer fronts and backs to length.
(7) Learn why the sides, back, and bottom of any given drawer is the same size; whether it is lipped 3 sides, lipped 4 sides, or flush front

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT G - TOPIC 1

Drawers (Kinds and Construction)

INFORMATION SHEET

Foreword:

The ability of a journeyman cabinetmaker to machine out drawers accurately and speedily can well mean the difference between a good job and no job at all.

Many employers take the attitude that if a cabinetmaker is a good drawer man he will be able to do any other work around the shop that he might be asked to do, and that in most cases, is very nearly the truth.

A man, to be a good drawer man, must be both fast and accurate, because drawers are one thing that must fit right, or they don't fit at all. It is not uncommon in the larger shops for a man to be given a truck load of drawers to machine out that contains as many as 25 to 30 different sizes and types of drawers. The apprentice can readily see that without a good and well tried system for machining out drawers, the first day on this job could well be the last. Even though there are very few journeymen who are good drawer men, it will be possible for every apprentice to be an expert on drawers if he will apply himself.

There are as many types of drawer construction as there are beans in Boston, but if the apprentice will learn one type of construction well, it will be very easy to apply this system to other and possibly poorer types of construction.

The three most commonly used styles of drawers are the lipped 3-sides, lipped 4-sides, and flush front drawers.

Materials:

A drawer to be durable must be built of a kind and thickness of wood that can reasonably be expected to give it a long and serviceable life and still not be too heavy and awkward looking.

A medium hardwood that is easily worked is best for ordinary purposes. If the drawers are for store fixture work or other hardwood case work, they should also be of hardwood.

Lumber should be dressed very carefully for thickness; for example, figuring 5/8" as the thickness of the sides and dressing them 1/32" oversize, 1/16" of the clearance will be lost, and by the same token if they are dressed 1/32" undersize, there will be an extra 1/16" of clearance and a sloppy fit.

A clearance of 1/8" sideways (1/16" on each side) and 1/8" in heighth should be allowed for soft wood case work. This may seem like a little too much, but in actual practice it is not. The proper thickness for the front of the drawer is 3/4", for the sides and back 5/8", and 1/4" plywood should be used for the bottom.

UNIT G - TOPIC 1

Drawers (Kinds and Construction)

INFORMATION SHEET (cont'd.)

Many small shops with lots of plywood scrap and not too many orders for drawers, use 1/2" plywood for the sides and back, sometimes even gluing two pieces of 1/4" plywood together to make the 1/2", but plywood does not make as good or neat a drawer side as solid wood. When left square on top, 5/8" sides look a little clumsy, but 1/2" stock has too much of a tendency to split where the bottom is plowed in. For that reason the better shops use a 5/8" side with a bead or some other convenient mold on the top edge to break the bluntness. For this lesson a bead that is 3/16" high and 5/16" wide is used to break the plainness of the top of the drawer side.

Drawer Opening:

After the kind and thickness of materials to be used have been chosen, the next operation is to bill out the drawers. A formula and a lot of practice will be needed in order to get the speed and accuracy desired.

In listing drawer openings be sure to list the width of opening first, the heighth second, and next the depth of the case (that is the distance from the front of the face frame to the front of the back or wall as the case may be.)

Formula for determining dimensions of drawer parts:

1. Lipped 3-sides drawer (for opening 13" x 4-1/2" x 21")
    - a. Front dimensions:
        - (1) 3/4" thick
        - (2) 1/4" wider than heighth of opening
        - (3) 1/2" longer than width of opening
        - (4) Opening 13" x 4-1/2" requires front 3/4" x 4-3/4" x 13-1/2"
    - b. Side dimensions:
        - (1) 5/8" thick
        - (2) 1/8" narrower than heighth of opening
        - (3) 1/4" shorter than net depth
        - (4) Opening 13" x 4-1/2" x 21" requires two sides 5/8" x 4-3/8" x 20-3/4"
    - c. Back dimensions:
        - (1) 5/8" thick
        - (2) 15/16" narrower than side
        - (3) 1-3/8" shorter than front
        - (4) Opening 13" x 4-1/2" requires back 5/8" x 3-7/16" x 12-1/8"
        - (5) If back is off as much as 1/16", proper fit will not result

UNIT G - TOPIC 1

Drawers (Kinds and Construction)

INFORMATION SHEET (cont'd.)

- d. Bottom dimensions:
    - (1) 1/4" thick
    - (2) 1/16" narrower than back is long
    - (3) 1/4" shorter than side
- e. Use of stop:
    - (1) Make hinged stop for table saw; hinged part exactly 1-3/8" long
    - (2) Using the stop to cut fronts and backs to net length will:
        - (a) Cut backs exactly 1-3/8" shorter than fronts
        - (b) Make the two sides parallel
    - (3) If several members the same size are being cut, using stop, check accuracy after one or two have been cut. Drawers must be accurate or a neat size, as the old timers would say, for the slightest variation in sizing will prevent some of the drawers from going into the openings.

NOTE: This formula applies only to drawers that are machined out according to the accompanying drawing, Detail No. I. A thorough knowledge of this system will prove adaptable to other types of construction. If a system is not thoroughly learned in the beginning, it will be difficult to qualify as a good drawer man.

2. Lipped 4-sides drawer (for opening 13" x 4-1/2" x 21")

- a. Front dimensions:
    - (1) 3/4" thick
    - (2) 1/2" wider than heighth of opening
    - (3) 1/2" longer than width of opening
    - (4) Opening 13" x 4-1/2" requires front 3/4" x 5" x 13-1/2"
- b. Side dimensions:
    - (1) 5/8" thick
    - (2) 1/8" narrower than heighth of opening
    - (3) 1/4" shorter than depth
    - (4) Opening 13" x 4-1/2" x 21" requires two sides 5/8" x 4-3/8" x 20-3/4"
- c. Back dimensions:
    - (1) 5/8" thick
    - (2) 15/16" narrower than side
    - (3) 1-3/8" shorter than front
    - (4) Opening 13" x 4-1/2" requires back 5/8" x 3-7/16" x 12-1/8"
    - (5) This length must be exactly right.

UNIT G - TOPIC 1

Drawers (Kinds and Construction)

INFORMATION SHEET (cont'd.)

d. Bottom dimensions:
  (1) 1/4" thick
  (2) 1/16" narrower than back is long
  (3) 1/4" shorter than side

e. Use of stop (same as 1 e.)

NOTE: By comparing formulas "1" and "2" you will notice that all members of a drawer for a given opening will be the same size except the fronts.

3. Flush front drawer (for opening 13" x 4-1/2" x 21")

a. Front dimensions:
  (1) 3/4" thick
  (2) 1/32" wider than heighth of opening
  (3) 1/16" longer than width of opening
  (4) Opening 13" x 4-1/2" requires front 3/4" x 4-17/32" x 13-1/16"

b. Side dimensions:
  (1) 5/8" thick
  (2) 1/8" narrower than heighth of opening
  (3) 1/4" shorter than depth
  (4) Opening 13" x 4-1/2" x 21" requires two sides 5/8" x 4-3/8" x 20-3/4"

c. Back dimensions:
  (1) 5/8" thick
  (2) 15/16" narrower than sides
  (3) 15/16" shorter than front
  (4) Opening 13" x 4-1/2" requires back 5/8" x 3-7/16" x 12-1/8" (Notice that this back comes out exactly the same size as the back for a lipped 3-sides and 4-sides drawer for the same size opening.)

d. Bottom dimensions:
  (1) 1/4" thick
  (2) 1/16" narrower than back is long
  (3) 1/4" shorter than side

e. Use of stop:
  (1) For flush front drawers make hinged stop for table saw with hinged part exactly 15/16" long
  (2) Using stop to cut fronts and backs to net length will:
    (a) Cut backs exactly 15/16" shorter than fronts
    (b) Make the two sides parallel

UNIT G - TOPIC 1

Drawers (Kinds and Construction)

INFORMATION SHEET (cont'd.)

Methods of Machining Drawers:

After drawer parts have been carefully sized, the detail should be studied before beginning to machine the drawer. Notice that a locked corner is used where the side joins the front, and the back is plowed in. The first thought may be that this will take too much time to machine, for the average job, but if instructions are followed closely the drawer may be machined much faster than the average man can machine the simplest drawer without using this routine. It will take considerably longer to machine this drawer the first time on a strange saw, but if the same equipment is used a few times, it will be simple to machine a good drawer.

1. Lipped 3-sides drawer:

   a. Trial cut:
      (1) Put one side cutter of dado head on saw
      (2) Raise cutter 1/4" above table
      (3) Set fence a scant 1/4" from cutter
      (4) Run piece of scrap over this setup (preferably 5/8" x 3" x4") to get exact width of kerf made by side cutter
      (5) Save scrap for next setup as exactly the same cut will be made later on front end of sides

   b. First cut:
      (1) Study closely the cut in ends of the front
      (2) Place both outside cutters of dado head on mandrel, making a 1/4" cutter
      (3) Adjust cutter to cut 15/16" deep
      (4) Set fence 1/8" from the cutter
      (5) Run piece of scrap over this setup, making a plow in the end of the piece
      (6) If setup is right, there will be a 1/4" plow, 15/16" deep, and a tongue 1/8" thick left
      (7) Adjust the fence, if necessary, until tongue fits in kerf made with 1/8" cutter on trial cut (this should fit just tight enough to support its own weight)
      (8) Put plow in both ends of the front, or if there are several lipped front drawers, regardless of size, run them all through on this setup, occasionally checking depth of cut and thickness of tongue.
      (9) IN THIS INSTANCE STOCK IS NOT RUN WITH THE FACE TO THE FENCE. DRAWER FRONTS MUST BE RUN WITH THE BACK OR INSIDE TO THE FENCE. (The reason for this is because a slight variation in thickness would, if run with the face to the fence, throw off the fit of the tongue, but by running it with the inside to the fence, a uniform fit will be maintained and a slight variation on the face of the drawer could not be seen.)

UNIT G - TOPIC 1

Drawers (Kinds and Construction)

INFORMATION SHEET (cont'd.)

c. Second cut:
  (1) Take first cut for the rabbet in top of the front; this cut must be 9/16" deep and must line up with the plow in the end.
  (2) Without moving the fence, drop the dado head to 9/16" and with the drawer front still with the inside to the fence, make a plow across the top 1/4" wide and 9/16" deep.
  (3) After running all the fronts over this setup, leave the dado set at 9/16" deep and move fence over 9/16" from the dado.
  (4) Run the top of the front across the dado with the face to the fence, removing 1/8" tongue left by the first cut and completing the rabbet. (See detail) The reason for using this method of making the rabbet is:

    (a) To assure that completed cuts on ends and top of drawer will line up, and
    (b) Because this setup can be made without stopping or changing the saw (that is where the most time is gained or lost in machining drawers).

d. Third cut:
  (1) After completing all fronts this far, study the detail for the sides.
  (2) There is a 1/4" plow, 1/4" deep and 1/2" up from the bottom, and another 1/4" plow, 1/4" deep and 1/2" in from the back, so the dado is set to cut 1/4" deep
  (3) Set the fence 1/2" from dado and again try setup on a block
  (4) Make any necessary adjustments, then run plow in one side and one end of the sides (see detail)
  (5) Be sure to place best side of the sides next to saw table as they will be the inside of the drawer
  (6) Take extreme care to run the sides in pairs; run side first and then the end, then the end first and the side next
  (7) Run all of the sides over this setup regardless of size
  (8) By referring to detail again, it will be found that a 1/4" plow, 1/2" up from the bottom of the front is necessary
  (9) Without changing the setup, place the drawer front with the face up and the bottom edge next to the fence and run it across the same setup. This will make the plow for the bottom line up around the drawer.

e. Fourth cut:
  (1) Shut off the saw and remove one of the side cutters
  (2) With the 1/8" cutter set to cut 1/4" deep, and with fence 9/16" from the cutter, run ends of the front across saw with face up
  (3) If setup is right, the end of the 1/8" tongue left on first setup will be cut off, leaving it 1/4" long and 1/8" thick

Drawers (Kinds and Construction)

INFORMATION SHEET (cont'd.)

    (4) Set the fence 1/4" from cutter and run sample block across. This should give a cut that exactly fits the tongue left on the front
    (5) Make necessary adjustments until this cut does fit the front snugly
    (6) With drawer sides face down and front end next to the fence, make final cut on the sides

  f. Fifth cut:
    (1) With 1/8" cutter still set to cut 1/4" deep, set the fence 1/4" from the cutter
    (2) Make a cut or slot in each end of the back
    (3) Adjust the saw to complete this rabbet (see detail), leaving a tongue 1/4" x 1/4" on each end of the back

  g. Shaper work:
    (1) Run a bullnose cut on all four sides of the front
    (2) Run a 3/16" x 5/16" bead on top edges of sides
    (3) Cut the 1/4" plywood bottom according to the formula
    (4) Machining is now completed and drawer is ready for sanding and assembling

2. Lipped 4-sides drawer:

  a. Trial cut (same as for lipped 3-sides drawer)

  b. First cut (same as for lipped 3-sides drawer)

  c. Second cut:
    (1) Take first cut for the rabbet in top of the front; this cut must be 9/16" deep and must line up with the plow in the end
    (2) Without moving fence drop dado to cut 1/4" deep and with front of drawer to fence, run the bottom edge of the front across the dado making a plow 1/4" wide and 1/4" deep
    (3) Leave the dado set at 1/4" deep and move fence over 9/16" from dado; with the face to the fence remove 1/8" tongue left by first cut
    (4) Adjust dado to cut 9/16" deep and without moving fence, remove tongue left by first cut

  d. Third cut (same as for lipped 3-sides drawer)

  e. Fourth cut (same as for lipped 3-sides drawer)

  f. Fifth cut (same as for lipped 3-sides drawer)

  g. Shaper work (same as for lipped 3-sides drawer)

Drawers (Kinds and Construction)

INFORMATION SHEET (cont'd.)

3. Flush front drawers:

   a. Trial cut (same as for lipped 3-sides and lipped 4-sides drawers)

   b. First cut:
      (1) Study closely the cut in ends of front on detail
      (2) Place both outside cutters of dado head on mandrel, making a 1/4" cutter
      (3) Adjust cutter to cut 23/32" deep (this must be very accurate)
      (4) Set fence 1/8" from cutter
      (5) Run piece of scrap over setup making plow in the end
      (6) If setup is right, there will be a 1/4" plow, 23/32" deep, and a tongue 1/8" thick left
      (7) Adjust fence, if necessary, until tongue fits kerf made with 1/8" cutter on trial cut (this should fit just tight enough to support its own weight)
      (8) Put plow in both ends of front, or if there are several flush fronts, regardless of size, run them all through on this setup, occasionally checking depth of cut and thickness of tongue
      (9) Be sure to run fronts with back or inside to fence

   c. Second cut:
      (1) Take first cut in rabbet in top of front; when finished, this rabbet will be 11/32" deep and must line up with plow in ends
      (2) Without moving fence, drop the dado to 11/32" and with drawer front still with inside to the fence, make a plow across the top 1/4" wide and 11/32" deep
      (3) After running all the fronts on this setup, leave the dado set at 11/32" deep and move the fence over 9/16" from the dado
      (4) Run the top of the front across the dado with face to the fence removing the 1/8" tongue left by first cut and completing rabbet

   d. Third cut (same as for lipped drawers)

   e. Fourth cut:
      (1) Shut off saw and remove one of side cutters
      (2) With 1/8" cutter set to cut 1/4" deep and fence set 11/32" from cutter, run ends of front across saw with face up
      (3) If this setup is right, the end of the 1/8" tongue left on first cut will be cut off leaving it 1/4" long and 1/8" thick
      (4) Set fence 1/4" from cutter and run sample block across. This should give a cut that exactly fits tongue left on front
      (5) Make necessary adjustments until this cut does fit the front snugly
      (6) With drawer sides face down and front end next to fence, make final cut on all the sides

UNIT G - TOPIC 1

Drawers (Kinds and Construction)

INFORMATION SHEET (cont'd.)

f. Fifth cut (same as for lipped drawers)

g. Shaper work (same as for lipped drawers except that there is no shaping on front)

Methods of Sanding and Assembling Drawers:

It is much better to have the planer sharp enough to dress the drawer sides and backs smooth without sanding than to try to sand them to an accurate thickness, but the drawer fronts must be sanded to remove all machine marks.

1. Lipped 3-sides and lipped 4-sides drawers:

a. Sanding:
(1) First sand the bullnose on all lipped fronts with a soft-faced sand block, using not more than 0-80 Garnet paper
(2) Belt sand the face of drawer with 0-80 belt, removing all machine marks and hand sanding marks on the face (do not sand the back of the front as this would tend to make the tongue too thin)

b. Assembly:
(1) Place drawer front in bench vise and with inside of drawer facing you and the end of front at least 1" above vise (care should be taken to clean jaws of vise so that they will not mark finished front)
(2) Spread a small amount of good cold glue in the plow and on the tongue (in the end of drawer front)
(3) Fit side on front, being sure that plow for bottom lines up on front side
(4) Nail with 4^D finish nails and set heads slightly (care should be taken not to nail in plow for bottom)
(5) Turn drawer front over and fasten other side in the same manner
(6) Take drawer front out of vise and fit back into sides (without glue). The flat side of back should be facing the drawer front and rabbeted side to the back. Care should be taken to line up the bottom of the back with the top of the plow in the sides.
(7) Nail back in with 4^D finish nails and set nails slightly
(8) Spread a small amount of cold glue in plow at bottom of front
(9) Set drawer on front (be sure that bench is clean so as not to dent front) and slide bottom in place with the best side up
(10) Place drawer upside down on bench with back facing you and adjust drawer until sides are square with front
(11) Nail bottom on to back (without glue) with 4^D box nails

NOTE: If the directions have been followed closely and the machining accurate, the drawer will not only be neat and substantial, but will have the proper clearance in the opening.

Drawers (Kinds and Construction)

INFORMATION SHEET (cont'd.)

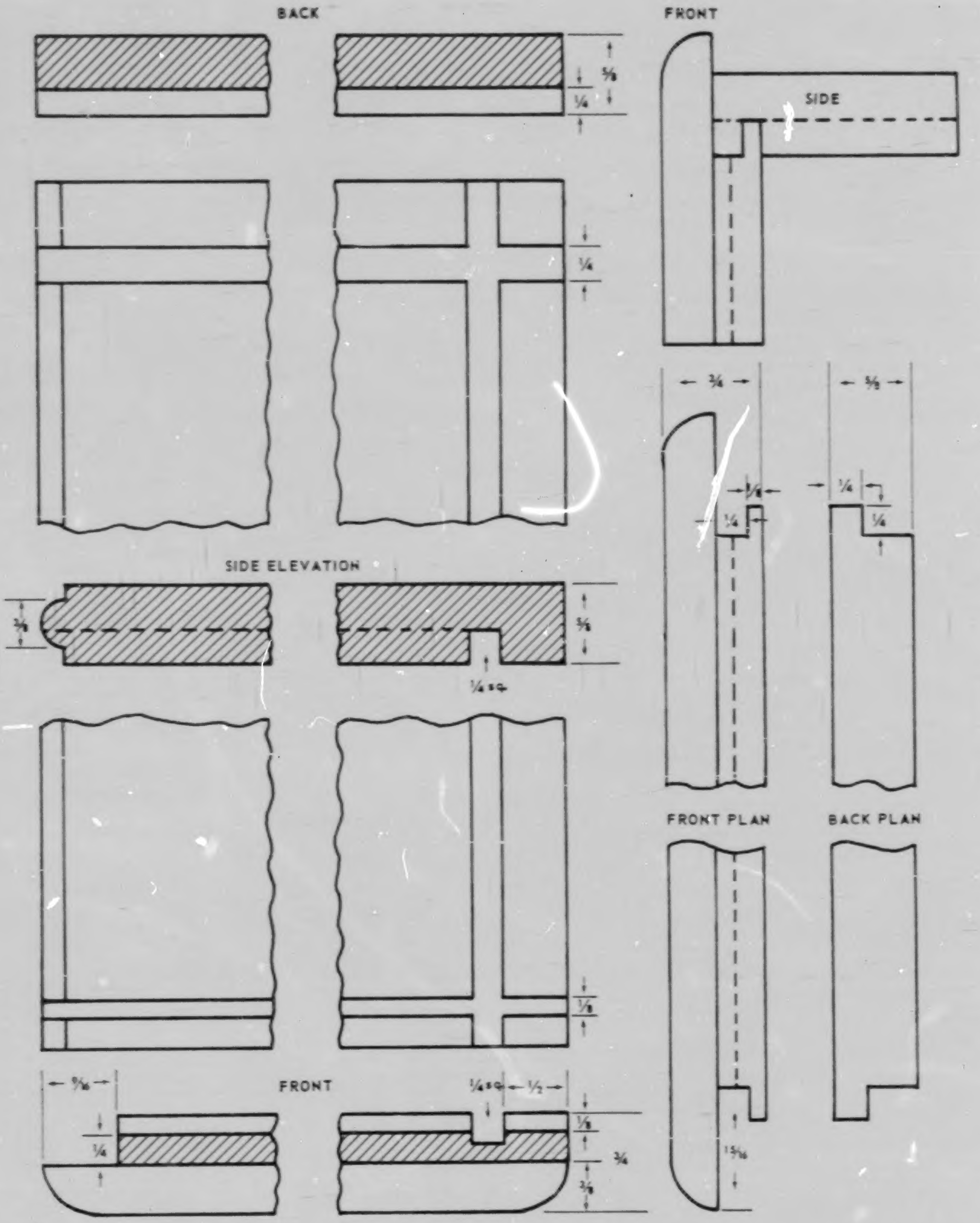
2. Flush Front Drawers:

On flush front drawers the top edge and ends should be beveled by hand on the back side a good 1/32" before sanding.

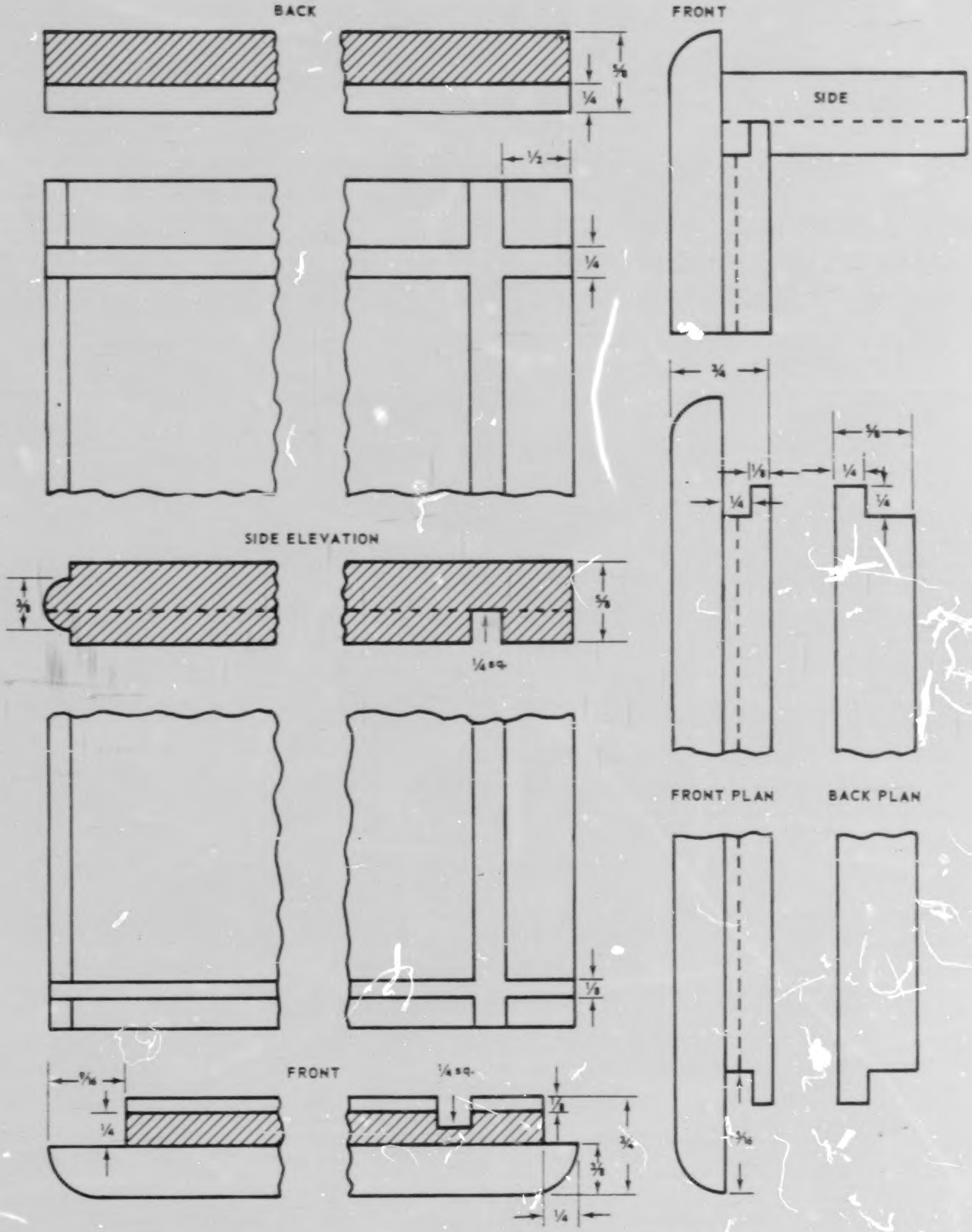
a. Sanding:
   (1) Sand the face of the drawer with 0-80 belt, removing all machine marks

b. Assembling:
   (1) All steps in assembling a flush front drawer are the same as for lipped drawers

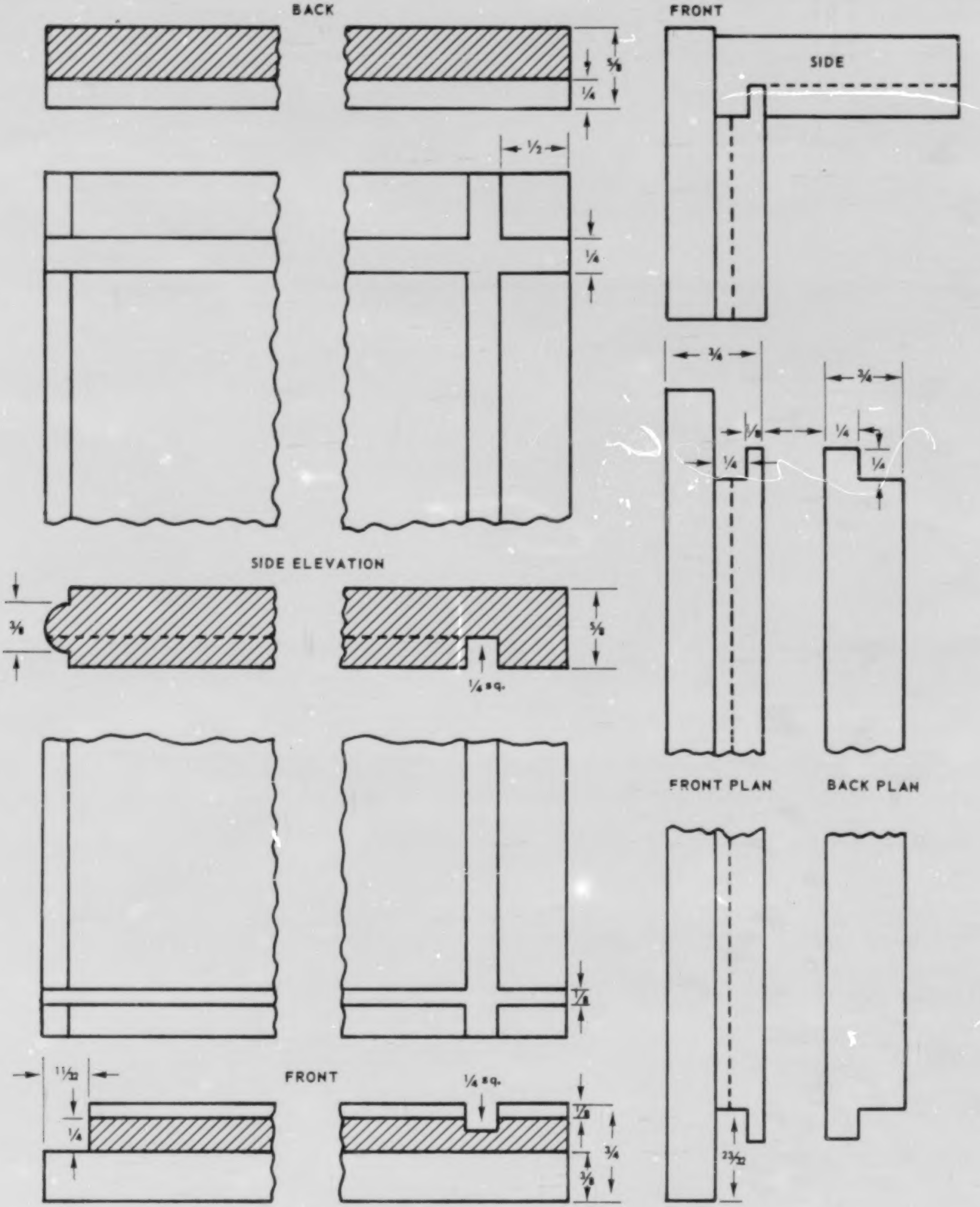
c. Fitting:
   (1) Each flush front drawer must have the front fit to the opening in which it is to be used after the drawer is assembled.
   (2) Mark each drawer and its opening with a corresponding mark.


BACK
FRONT
SIDE
5/8
1/4
1/4
SIDE ELEVATION
3/8
5/8
1/4 sq
1/8
9/16
FRONT
1/4 sq
1/2
1/4
1/8
3/4
3/8
3/4
5/8
1/8
1/4
1/4
1/4
FRONT PLAN
BACK PLAN
15/16

DETAIL 1 — DRAWER LIPPED THREE SIDES


BACK
⅝
¼
½
¼
SIDE ELEVATION
⅜
⅝
¼ sq.
⅛
FRONT
9/16
¼
¼ sq.
⅛
¾
⅜
¼
FRONT
SIDE
¾
⅛
¼
⅝
¼
¼
FRONT PLAN
BACK PLAN
3/16

DETAIL II — DRAWER LIPPED FOUR SIDES


BACK
5/8
1/4
1/2
1/4
FRONT
SIDE
3/4
1/8
1/4
3/4
1/4
1/4
SIDE ELEVATION
3/8
5/8
1/4 sq.
FRONT PLAN
BACK PLAN
1/8
11/32
FRONT
1/4 sq.
1/4
1/8
3/4
3/8
23/32

DETAIL III — DRAWER FLUSH FRONT

CABINETMAKING AND MILLWORK

UNIT G - TOPIC 2

Plastic Laminates

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of how to lay plastic laminate

STUDY ASSIGNMENT:

Cabinetmaking and Millwork, California Workbook, Part 2, pp. 89-93

REFERENCES:

Cabinetmaking and Millwork, California Workbook, Part 2

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Be able to explain what materials are used in the manufacture of plastic laminate.
Learn the resistance qualities of plastic.
Learn the advantages and disadvantages of different resins used.

INTRODUCTION TO NEXT LESSON:

Plastic laminates

CABINETMAKING AND MILLWORK

UNIT G - TOPIC 1

Plastic Laminates

LESSON OBJECTIVE:

To acquaint the apprentice with one of the newer substitutes that is now being used to replace hardwood tops on cabinets

STUDY ASSIGNMENT:

Cabinetmaking and Millwork, California Workbook, Part 2

REFERENCES:

Same as above

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Learn why a metal foil was originally used to produce cigarette-proof products.
Be able to compare the advantages of the different adhesives for field application.
Learn the types of adhesives available for shop application.
Learn the proper methods of cutting and machining plastic.

INTRODUCTION TO NEXT LESSON:

Plastic Laminates

CABINETMAKING AND MILLWORK

UNIT G - TOPIC 2

Plastic Laminates

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of plastic laminates

STUDY ASSIGNMENT:

To be provided in class

REFERENCES:

To be provided in class

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Instructor to give lesson on plastic laminate layup

INTRODUCTION TO NEXT LESSON:

Plastic Laminates

CABINETMAKING AND MILLWORK

UNIT G - TOPIC 2

Plastic Laminates

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of how to lay plastic laminate up

STUDY ASSIGNMENT:

To be provided in class

REFERENCES:

To be provided in class

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

(1) Plastic is a decorative material produced from numerous layers of different types of high strength paper impregnated with ____________ and ____________ resins.
(2) Plastic resists temperatures up to ______________ degrees and is not affected by alcohol.

INTRODUCTION TO NEXT LESSON:

Plastic Laminates

(Note: Five 4-hour class sessions allotted to this topic.)

TOPIC: EXAMINATION

USE CAL. TEST

GET EXAM FROM YOUR APPRENTICE CO-ORDINATOR

TOPIC: REVIEW OF EXAM

and

REVIEW WORK AS NEEDED TO CLEAR UP STUDENTS' PROBLEMS

ED 089019

MILLWORK AND CABINETMAKING

APPRENTICE-RELATED TRAINING

INSTRUCTOR'S MANUAL

3

3rd YEAR OF A
4-YEAR SERIES

VOCATIONAL EDUCATION
VE
COORDINATING
COUNCIL FOR
OCCUPATIONAL
EDUCATION

P. O. BOX [illegible]
OLYMPIA, WASHINGTON
[illegible]

U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
[illegible]

CE 001 058 (1)

MAY, 1971
P 71-61

MILLWORK AND CABINETMAKING

INDEX

THIRD YEAR - RELATED

UNIT	LESSON NO.	TOPIC	PAGE NO.
H	1 and 2	Test and Review (Millwork Terms)	08.01.01.01
	3 and 4	Basic Drawing and Lettering	08.02.03.01
	5 and 6	Layout Stick and Board	08.03.05.01
	7 thru 15	Blueprint Reading	08.04.07.01
	16 thru 17	Windows, Frames, and Sashes	08.05.16.01
	18 thru 21	Door Frames, Prehung, Veneers, and Cores	08.06.18.01
	22	Door and Sash Hardware	08.07.22.01
I	23 thru 30	Millwork and Job Planning	09.01.23.01
	31 thru 33	Store and Other Commercial Fixtures	09.02.31.01
	34 thru 36	Tests, Covering the Year's Work	09.03.34.01

MILLWORK AND CABINETMAKING

UNIT H - TOPIC 1

Terms and Abbreviations used in Millwork Trade

LESSON OBJECTIVE:

To test students knowledge of millwork terms and introduce new terms from the diversified shops in today's millwork industry.

STUDY ASSIGNMENT:

Read list of terms used in test and underline terms familiar to you. Make a notation of new terms you have used in your shop. A Journeyman must be able to talk the trade as well as use the equipment. The Apprentice should add new terms to his vocabulary at a faster rate than he picks up new skills. Make these terms you are now studying a good base to build your vocabulary house.

REFERENCES:

Architectural and Building Trades Dictionary
"Architectural Woodwork"

WORK ASSIGNMENT:

Match list of terms with discriptions on information sheet. Leave blank any terms with which you are not familiar. You may take list to work and have a Journeyman help you. You can test their knowledge of the trade at the same time. With the help of a Journeyman, make up two lists, one of old terms and one of new terms you think would help the new Apprentice.

INTRODUCTION TO NEXT LESSON:

Next week return with as many completed descriptions as possible. Please bring five old and five new words you think should be added to the list of study. Be prepared to defend your choice against those of other students.

MILLWORK AND CABINETMAKING

UNIT H - TOPIC 1

Terms and Abbreviations used in Millwork Trade

LESSON OBJECTIVE:

Complete list started from previous week. Discuss terms not familiar to students from list and from new list compiled by students.

STUDY ASSIGNMENT:

Study all terms discussed in two lessons and remove those you think are now outdated.

REFERENCES:

All material gathered by students.

IMPORTANT STUDY FACTORS:

Remember the best craftsman must know every part of the building industry. Do not confine your list to just cabinetmaking.

WORK ASSIGNMENT:

Add to your list all the terms with their definitions discussed in and out of class. This is your start on a good notebook.

Complete final test and hand in.

INTRODUCTION TO NEXT LESSON:

Basic drawing and the use of equipment will be covered in next lesson. Bring samples of details used in your shop. Pencils as usual are a must.

TEST ON MILLWORK TERMS

__________ 1. Keeps plastic laminate from warping.

__________ 2. The strip of plastic laminate or veneer on edge of counter or table top.

__________ 3. Is usually caused in the felling of the tree.

__________ 4. Windows or open area above normal ceiling height.

__________ 5. Joint used for inside corners.

__________ 6. Growth pattern found in hardwood such as birch which makes machining difficult.

__________ 7. Machining done to back of casing or base.

__________ 8. A vertical routed joint used in joining drawer fronts to sides.

__________ 9. A metal fastener with machine threads on one end and lag screws on the other end.

__________ 10. When tread and riser are routed in.

__________ 11. Used for fastening to plaster board or hollow masonry.

__________ 12. Found in hollow core doors for attaching door hardware.

__________ 13. Veneer cut off log with a lathe in one continuous sheet.

__________ 14. Plywood panels with edge glued wood for a separator.

__________ 15. Panels made of chips or sawdust.

__________ 16. Lumber of any length or width.

__________ 17. Slats placed in doors or windows at an angle to permit air flow.

__________ 18. Veneer or lumber cut at right angles to the growth rings.

__________ 19. Glue up patterns for sliced veneer.

__________ 20. Bolt used in joining counter tops or panels.

__________ 21. Metal strip used in aligning panels or counters.

__________ 22. Fastener used for miter joints.

__________ 23. Voids or defects caused by improper drying.

__________ 24. Two pieces of glass separated by dead air space.

__________ 25. Putty between fixed stop and glass.

__________ 26. Putty placed after glass is fastened in place.

TEST ON MILLWORK TERMS (Continued)

_______________ 27. A pattern of small molding that consists of three beads with the middle one slightly raised above the others. Screen molding is a common example of this type of molding.

_______________ 28. A horizontal wood molding on interior wall to protect it from damage by chair backs.

_______________ 29. A flat piece of lumber used to provide a finish and to protect the wall and placed at the junction of the wall and floor.

_______________ 30. A T-shaped molding attached to one of a pair of swinging doors, against which the other door strikes.

_______________ 31. A stair which swings into a stairwell when not in use and which may be readily pulled into position when access to another floor is desired. These stairs are designed to save the space taken up by a stationary stair.

_______________ 32. A strip of the same kind of wood and of the same thickness as stair treads, about four-inches wide, rabbeted on one side to the thickness of the finished floor and nosed the same as the treads.

_______________ 33. The frame into which a door swings in the outside wall of a building.

_______________ 34. An outside door which can be changed from a screen door to a storm door by removing a screen panel and replacing it with a glass panel.

_______________ 35. A molding run with a groove on the under side to cover an electric wire or cable.

_______________ 36. Where the sticking of the door is run solid on the edge of the stiles and rails and not planted on.

_______________ 37. Chain used in place of sash cord. It is strong and does not twist or kink and comes in several sizes and finishes.

_______________ 38. This type of window consists of two sash arranged in the frame so as to slide vertically each past the other. The check rail is the same thickness as the rest of the sash.

_______________ 39. Sizes which are not carried in stock and are made to order.

_______________ 40. A strip with a rabbet to cover the edge of the wainscot.

_______________ 41. A list of articles and sizes that are carried in stock.

_______________ 42. The first riser at the foot of the stairs.

_______________ 43. A piece of wood, usually of oak, beveled on both edges to be placed on the floor underneath the closed door, acting also to close the space.

TEST ON MILLWORK TERMS (Continued)

________________ 44. Any door in which the visible framework is made up of some combination of stiles and rails.

________________ 45. This term indicates the various items of linear stock that are used for cutting into lengths suitable for stiles, rails, bars, and muntins of windows and sash. They are manufactured in three thicknesses; 1-1/8", 1-3/8", and 1-3/4".

________________ 46. A horizontal board that covers the inside edge of a sill of the window frame.

________________ 47. Strips of wood which are fastened to the jambs of the window frame to hold the window in place.

________________ 48. These are half columns or newels placed against the building to receive the rail of a porch or porch deck.

________________ 49. Any short or light bar either vertical or horizontal in a sash or door between glass or panels and not extending the full width or length of the article.

________________ 50. Doors having stile and rail construction with the space between filled with wood panels.

________________ 51. The opening size of a window or sash is the finished size as it sets in place in the frame.

________________ 52. The cross or horizontal members of the framework of a sash, door, blind, or on paneled assembly.

________________ 53. A short round pin which makes a joint between two pieces of wood by being inserted into adjacent holes in each piece.

________________ 54. A molding planted on face of door jambs to stop the door.

________________ 55. A type of door which has an absolutely plain surface from edge to edge.

________________ 56. Molding used to fasten glass in doors or window sash.

________________ 57. An upright or vertical bar usually wider than the ordinary bar, dividing the glass in a sash or dividing two sashes in a frame.

________________ 58. A molding used to hold the bottom sash of a doublehung window in place in the window frame.

________________ 59. An opening without doors, finished with jambs and trim.

________________ 60. Small spindles or columns fastened between a top railing and secured at the bottom to form the main part of the railing on a stairway or balcony.

________________ 61. A door which opens to a seldom used part of a building or to concealed equipment such as plumbing.

TEST ON MILLWORK TERMS (Continued)

____________ 62. Molding used next to the floor on interior baseboard.

____________ 63. The surrounding case into which, and out of which, a door closes and opens. It consists of two upright pieces called jambs and a header fitted together and rabbeted.

____________ 64. A list of cuttings with sizes given in accurate measurements to be used in the manufacture of a proposed piece of millwork.

____________ 65. A small flat face or band used to separate moldings.

____________ 66. Fitting woodwork to an irregular surface.

____________ 67. A molding whose cross section would be one-quarter of a circle.

____________ 68. The continuation of any molding in a different direction which is ussually at right angles covering up end-grain.

____________ 69. A strip of lumber which is grooved on the top to receive the balusters of a balustrade.

____________ 70. Cord or rope made especially for balancing of weights with the sash in check rail windows.

____________ 71. Panels that increase rather abruptly in thickness at a point from one to two inches from the enclosing frame.

____________ 72. Any sash that slides up and down requires some kind of a balance. The three leading types of mechanical sash balances are tape- or drum-type, flat-type, and spiral type.

____________ 73. The core of a veneered door is almost always built-up of short pieces. This is what is called piece core construction.

____________ 74. A name given to articles which are supposed to be reproductions of the same article during the colonial period of architecture.

____________ 75. A door made of sheathing secured by strips of board placed crosswise.

____________ 76. A molding placed on the exterior topside of a door or a window to cause the water to drip on the outside of a frame.

____________ 77. A glazed door without panels and having the glass opening divided into numerous small lights.

____________ 78. A blind or shutter wiht fixed slats sloping upward from without to admit air and light but to exclude rain and sun.

____________ 79. A molding whose cross section would show a half circle.

____________ 80. Any supporting pillar of wood, steel, masonry, or other material.

TEST ON MILLWORK TERMS (Continued)

________________81. Meeting rails thicker than a window used to fill the opening between the top and bottom sash made by the parting stop in the frame.

________________82. Moldings of various widths and thicknesses used to trim door and window openings.

________________83. A rectangular molding used in the assembly of a window.

________________84. Molding used on the side of a door or window casing for ornamentation or to increase the width of the trim.

________________85. The horizontal piece of wood trim below the stool of a window.

________________86. A large sash especially built for hot beds.

________________87. Any article of millwork which is machined but not assembled.

________________88. A group of lumber pieces so shaped and assembled to form an enclosure and support a door, window, or sash.

MILLWORK TERMS TO BE MATCHED WITH DEFINITIONS ON MILLWORK TERM TEST

1. Double glaze
2. Fish tail spline
3. Rift or quartered
4. Random Random
5. Lock rail or lock block
6. Hanger bolt
7. Cross grain
8. Clearstory
9. The backing
10. Face putty
11. Checks
12. Book match and slip match
13. Lumber core
14. Hearth or Slake
15. French dovetail
16. Back putty
17. Spline nail
18. Tight joint fastener
19. Housed stringer
20. Louvers
21. Particle board
22. Rotary cut
23. Toggle bolt
24. Back out or hollow back
25. Self edge
26. Cope
27. Solid sticking
28. Stock sheet
29. Sash stock
30. Muntin bar
31. Rail
32. Flush door
33. Knock down
34. Blind stop
35. Base shoe
36. Scribing
37. Shoe rail
38. Colonial
39. Half round
40. Raised panel
41. Drip cap
42. Cutting bill
43. Mullion
44. Apron
45. Landing tread
46. Baseboard
47. Plain rail window
48. Window stops
49. Opening size
50. Starting riser
51. Cold frame
52. Frame
53. Back band

MILLWORK TERMS TO BE MATCHED WITH DEFINITIONS ON MILLWORK TERM TEST

54. Casing
55. Column
56. Check rails
57. Cloverleaf pattern
58. Door stop
59. Wainscot cap
60. Sash cord
61. Sash balance
62. Piece core
63. French door
64. Jalousie
65. Stool
66. Dowel
67. Door, batten
68. Return
69. Stile and rail door
70. Cased opening
71. Door jamb, interior
72. Balusters
73. Quarter round
74. Fillet
75. Access door
76. Check stop
77. Glass stop
78. Chair rail
79. Attic access stairs
80. Astragal
81. Door frame, exterior
82. Electric molding
83. Combination door
84. Sash chain
85. Odd sizes
86. Threshold
87. Panel door
88. Split column or newel

MILLWORK AND CABINETMAKING

SELECTION OF PLYWOOD AND RELATED PANELS

On completion of the lesson panels and their best uses, the student should be able to select the right panel for any job he is given.

In the right column are some of the types, thicknesses and grades of panels found in woodworking shops. This is a judgment test. Select the best panel for the job by placing the letter in front of the panel in the blank next to the best use. Keep in mind STRENGTH, APPEARANCE, AND COST.

__________1. Red birch bookcase

__________2. Exterior vertical siding

__________3. High-gloss painted cabinet

__________4. Under course for floor tile

__________5. One panel stile rail interior door

__________6. Under course for hot roof

__________7. Under course for plastic lam. desk top

__________8. Drawer bottoms

__________9. Under course for kitchen sink counter top

__________10. Overlay cabinet doors

__________11. Sailboat planking

A. 1/4" select red birch

B. 3/4" exterior particle board

C. 5/16" creson plywood

D. 1/2" D. D. ext. sheathing

E. 1/4" A.D.R.C. int. plywood

F. 3/4" DFPA 1-11

G. 3/4" lumber core panels

H. 3/4" shop grade birch

I. 1/4" particle board

J. 1/4" V. G. 2S A. A. panel

K. 3/16" prefinished birch panel

L. 1/2" Celetex

M. 1/4" D. D. select red birch

N. V.G.A.A. teak panel

UNIT H - TOPIC II

Basic Drawing and Lettering

LESSON OBJECTIVE:

To teach more on millwork drafting.

STUDY ASSIGNMENT:

Read architectural drawing text listed under References below.

REFERENCES:

"Architectural Drawing for the Building Trades

WORK ASSIGNMENT:

Study factors listed under Study Factors Sheets 08.02.031-037. Answer questions on Sheets 08.02.031-037.

INTRODUCTION TO NEXT LESSON:

Expound on the importance of proper detailing to be able to make the layout stick.

CABINETMAKING AND MILLWORK
APPRENTICESHIP RELATED MATERIAL

UNIT H - TOPIC II

Basic Drawing and Lettering

LESSON OBJECTIVE:

To teach the apprentice the proper use of the necessary instruments and materials used in detail millwork drafting.

STUDY ASSIGNMENT:

Read architectural drawing text listed under References below, pages 1-7, 14-15.

IMPORTANT STUDY FACTORS:

1. Learn the correct type of pencil to use. This is determined by the type of paper and purpose of the drawing.
2. Learn the correct method of sharpening a pencil.
3. Learn the correct method of making erasures.
4. Learn how to keep the drawing clean.
5. Learn how to fasten the paper to the drawing board.
6. Learn how to lay out the drawing paper.

REFERENCES:

"Architectural Drawing for the Building Trades," Kenney and McGrail.

WORK ASSIGNMENT:

1. What type of pencil is used for tracing?______________________________
2. What type of pencil is used for lettering?____________________________
3. What type of pencil is used for sketching?____________________________
4. Which end of the pencil should be sharpened? Why?______________________
5. Why should a pencil be ________________ after sharpening?
6. What is the object of the layout of the drawing paper?__________________

____

UNIT H - TOPIC II

Basic Drawing and Lettering

LESSON OBJECTIVE:

To teach the apprentice proper lettering necessary for millwork detail drawing.

STUDY ASSIGNMENT:

Read architectural drawing text, pp. 14-17, listed under References below.

IMPORTANT STUDY FACTORS:

1. Know why good lettering is required of a good draftsman.
2. Learn the most common style of lettering.
3. Be able to give the significance of guide lines.
4. Learn the rules for lettering.

REFERENCES:

"Architectural Drawing for the Building Trades," Kenney and McCrail.

WORK ASSIGNMENT:

Copy Figures 18 and 19.

1. ______________________________ are the first rule of lettering.
2. Vertical strokes are all made ______________________________.
3. Horizontal strokes are all made from ______________________________.
4. All round letters should be made as ____________ as they are ____________.
5. Letters "M" and "W" are ______________________ than they are tall.
6. Letters B, E, K, S, X, and Z should be ____________ at the bottom than at the top.
7. Most letters should be ________________ narrower than they are tall.

CABINETMAKING AND MILLWORK
APPRENTICESHIP RELATED MATERIAL

UNIT H - TOPIC II

Basic Drawing and Lettering

LESSON OBJECTIVE:

To teach the apprentice how to select, use, and care for his drawing instruments.

STUDY ASSIGNMENT:

Read "Architectural Drawing for the Building Trades," pp. 1-13.

IMPORTANT STUDY FACTORS:

1. Learn what basic equipment is necessary.
2. Learn how to select the proper paper.
3. Be able to make and define the various lines required on a drawing.
4. Learn how to select the proper penicl and sharpen it correctly.
5. Learn the correct way to use a T-square and triangles.
6. Learn the proper procedure for drawing a garden plot.
7. Learn the proper procedure for drawing a garden lattice.

REFERENCES:

"Architectural Drawing for the Building Trades," Kenney and McGrail.

WORK ASSIGNMENT:

Copy Figures 13, 14, 15, and 16.

1. Do not drive thumbtacks with a ______________________________.
2. Do not rule lines along the edge of a ______________________________.
3. Do not draw with a ______________________________ pencil.
4. Do not sharpen a pencil ______________________________ a drawing board.
5. Do not redraw a line ______________________________.

WORK ASSIGNMENT (Continued):

6. Do not start work until you wipe off ____________________ and ____________________.

7. A center line is made up of alternate ____________________and ____________________ dashes and is used to locate centers.

CABINETMAKING AND MILLWORK
APPRENTICESHIP RELATED MATERIAL

UNIT H - TOPIC II

Basic Drawing and Lettering

LESSON OBJECTIVE:

To teach the apprentice how to make and understand the fundamentals of perspective, isometric and oblique drawings.

STUDY ASSIGNMENT:

Read "Architectural Drawing for the Building Trades," pp. 24-29.

IMPORTANT STUDY FACTORS:

1. Learn which type of drawing is the most common method of illustrating.
2. Know which drawings must be made to scale.
3. Know when to use an isometric type drawing.
4. Become familiar with the type of drawings that should be used on irregular forms and intricate details.

REFERENCES:

"Architectural Drawing for the Building Trades," Kenney and McGrail.

WORK ASSIGNMENT:

Copy Figures 37, 38, 39.

UNIT H - TOPIC II

Basic Drawing and Lettering

LESSON OBJECTIVE:

To teach the apprentice how to dimension various objects and where the dimensions should be placed.

STUDY ASSIGNMENT:

Read "Architectural Drawing for the Building Trades," pp. 18-23.

IMPORTANT STUDY FACTORS:

1. Remember that a geometric figure is the basis of all drawings.
2. Learn how to bisect a straight line.
3. Learn how to erect a perpendicular line.
4. Learn how to draw a line parallel to a given line.
5. Learn how to bisect an angle.
6. Learn how to divide a line into equal parts.
7. Learn how to divide a space between two lines into any number of equal spaces.
8. Learn how to draw a pentagon, hexagon, octagon, and ellipse.

REFERENCES:

"Architectural Drawing for the Building Trades," Kinney and McGrail.

WORK ASSIGHMENT:

1. Copy Figures 20 to 35.
2. Draw Geometric-Diagram Test, Figure 36.

UNIT H - TOPIC II

Basic Drawing and Lettering

LESSON OBJECTIVE:

To teach the apprentice the basic principles and purpose of detail millwork drawings.

STUDY ASSIGNMENT:

Read "Architectural Drawing for the Building Trades," pp. 30-31.

IMPORTANT STUDY FACTORS:

1. Learn the purpose of shop detail drawings.
2. Learn the purpose of a floor plan.
3. Learn the purpose of an elevation.
4. Learn the purpose of a sectional view.
5. Learn the purpose of full-size sections.

REFERENCES:

"Architectural Drawing for the Building Trades," Kenney and McGrail.

WORK ASSIGNMENT:

1. A floor plan is necessary to show the ____________________ of the detail object in relationship to the rest of the room.
2. An ____________________ shows what the object will look like (a picture).
3. A ____________________ view shows how the object would look if it were cut in two parts.
4. A ____________________ section shows parts of the object in actual size.

MILLWORK AND CABINETMAKING

UNIT H - TOPIC 2

Basic Drawing and Lettering

LESSON OBJECTIVE:

To teach the apprentice the equipment and development of shop drawings

STUDY ASSIGNMENT:

Study Workbooks, Part 2, Unit B and Part 3, Unit C

REFERENCES:

California Workbook, Part 2, pp. 9-26
California Testbook, Part 2, Unit B, pp. 17-27
California Workbook, Part 3, Unit C, pp. 101-114
California Testbook, Part 3, Unit C, pp. 49-55

WORK ASSIGNMENT:

Complete tests in California Testbook, Part 2, Unit B
Complete tests in California Testbook, Part 3, Unit C
Take and correct tests 08.02.041-045

INTRODUCTION TO NEXT LESSON:

Introduce "Architectural Drawing for the Building Trades," Kenny & McCrail

UNIT B. BLUEPRINT READING AND STOCK BILLING

(For Problems 1-6 you will need to have both a standard rule and an architect's scale.)

1. At the scale of 3/4" = 1'0", a dimension of 2'6" will be represented by a line how long? 1. ______

   1. 3/16" 3. 3/8"
   2. 5/16" 4. 5/8"

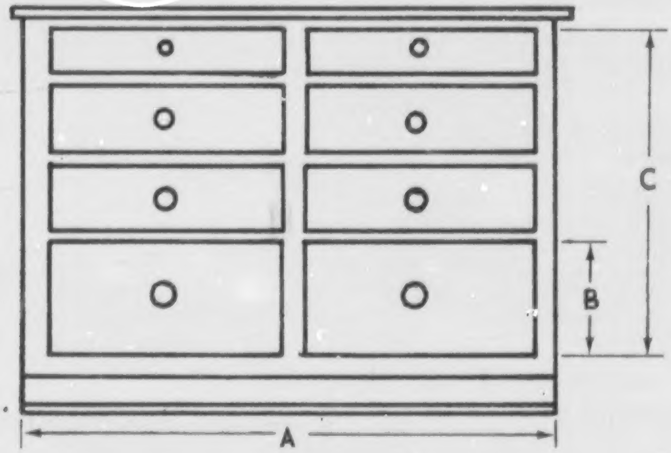
2. At half scale, a line 4-1/2" long will represent what dimension? 2. ______

   1. 7'6" 3. 9'0"
   2. 8'0" 4. 9'6"

3. In a drawing made at the scale of 1/4" = 1'0", what length of line is required to indicate a 7'0" dimension? 3. ______

   1. 1-3/4" 3. 2-1/8"
   2. 1-15/16" 4. 2-3/16"

Questions 4, 5, and 6 are based on the drawing below, which is made at the scale of 3/4" = 1'0".



4. Dimension A = 4. ______

   1. 3'8" 3. 4'8"
   2. 4'0" 4. 5'0"

5. Dimension B = 5. ______

   1. 0'8" 3. 0'9-1/2"
   2. 0'9" 4. 0'10"

6. Dimension C = 6. ______

1. 2'0"
2. 2'5-1/2"
3. 2'11"
4. 3'4-1/2"

7. An orthographic drawing requires: 7. ______

1. One basic view
2. Any number of views the draftsman wishes
3. Three views, regardless of the shape of the object
4. All views that show differences in shape

8. Width and height are shown by: 8. ______

1. The end elevation
2. The front elevation
3. Any of the three views
4. The plan view

9. Width and depth are shown by: 9. ______

1. Any of the three views
2. The end elevation
3. The front elevation
4. The plan view

10. Height and depth are shown by: 10. ______

1. The end elevation
2. Any of the three views
3. The plan view
4. The front elevation

11. An imaginary cut made through an object horizontally forms a: 11. ______

1. Section through end
2. Longitudinal section
3. Plan section
4. Section to scale

12. An imaginary cut through an object, made vertically from side to side, forms a: 12. ______

1. Section through end
2. Longitudinal section
3. Plan Section
4. Section to scale

13. A quantity survey is a: 13. ______

1. Factory order
2. Set of specifications
3. Stock bill
4. Listing of complete units

14. All but one of the following areas of knowledge is required of the stock biller. Which of these is not essential? 14. ______

1. Furniture finishes
2. Mathematics
3. Lumber grades
4. Construction methods

15. When a stock bill is to be made up, the man whose job it is to decide on the exact types of construction is the: 15. ______

1. Stock biller
2. Detailer
3. Department foreman
4. Stock cutter

CABINETMAKING AND MILLWORK
APPRENTICESHIP RELATED MATERIAL

UNIT G: BLUEPRINT READING AND LAYOUT

1. An object appears least distorted in which kind of drawing? 1. ________

   1. Orthographic
   2. Cabinet
   3. Isometric
   4. Perspective

2. The type of drawing that appears most natural to the eye is: 2. ________

   1. Cabinet
   2. Perspective
   3. Orthographic
   4. Isometric

3. A cabinet drawing is a kind of: 3. ________

   1. Orthographic drawing
   2. Pictorial drawing
   3. Perspective drawing
   4. Isometric projection

4. The method of pictorial drawing least often used in cabinetmaking and millwork is: 4. ________

   1. Cabinet drawing
   2. Isometric drawing
   3. Three-point perspective
   4. Two-point perspective

5. Customarily, one axis of an isometric drawing is: 5. ________

   1. Horizontal
   2. Inclined 45° from horizontal
   3. Vertical
   4. Inclined 30° from vertical

6. The drawing that shows the location of the structure on the building site is the: 6. ________

   1. Pictorial drawing
   2. Front elevation
   3. Floor plan
   4. Plot plan

7. The imaginary horizontal slice that opens a building to view in a floor plan is usually about what height above the floor? 7. ________

   1. 6 ft.
   2. 1 ft.
   3. 2 ft.
   4. 4 ft.

8. Cabinetwork joinery details are usually found in: 8. ________

   1. Shop drawings
   2. Schedules
   3. Architectural drawings
   4. Architectural specifications

9. The body of the steel square is also called the: 9. ________

   1. Hypotenuse
   2. Heel
   3. Blade
   4. Tongue

10. If a long brace is to be made in which total run is less than total rise, the first step in the layout is to divide the run into as many units as there are feet in the: 10. ________

    1. Span
    2. Run
    3. Rise
    4. Hypotenuse

UNIT H - TOPIC III

Layout Stick and Board

LESSON OBJECTIVE:

To acquaint the apprentice with the reasons and necessity of rod and panel layout.

STUDY ASSIGNMENT:

California Workbook, Part 2, Unit E., pp. 57-60. Information Sheets 08.03.051 to 08.03.055

IMPORTANT STUDY FACTORS:

1. Learn the importance of stick and panel size.
2. Learn to gather all information before proceeding.

REFERENCES:

"Cabinet Making and Millwork, Dahl, Alf, and J. Douglas Wilson, pp. 112-119.

WORK ASSIGNMENT:

California Testbook, Part 2. Unit E, pp. 59-63.
Test 08.03.05.07 and 08.03.05.08.

INTRODUCTION TO NEXT LESSON:

Assemble samples of Follower Blocks and Guides. Have each student bring a plywood Layout Stick 1/2 to 3/4" x 4" x 6'0" for desk layout.

INFORMATION SHEET

UNIT H - TOPIC III

ROD LAYOUT

The detail construction layout rod, commonly called simply the "layout rod" by the workmen using it consists of condensed cross-sectional details of the piece of wood construction to be produced, with all parts drawn accurately to full size so that they fit perfectly into associated parts.

The true origin of the layout rod is practically impossible to find. The first reference to anything remotely resembling the layout rod mentions a composition cardboard drawing brought here by two cabinetmakers from Sweden.

Investigation seems to indicate that the system of layout rods was first instituted by Berkey and Gay Company, furniture manufacturers of Grand Rapids, Michigan, under the direction of Frank Kennedy. Amonth the various ones who carried on where Mr. Kennedy left off in the elimination of unnecessary lines, standardization of descriptions and specification of the layout rod, the names of Max Krause and Andy Bopp are universally acclaimed.

Prior to the advent of the rod, a sample was built--usually by hand--from a designer's drawing or copied from some original piece or built up from a series of rough ideas crudely sketched and worked out in the wood. After management had approved the sample, it was disassembled and the component parts were used as samples. This practice proved unsatisfactory for as the patterns were continually used in making setups, they became worn, and mismeasurements thus obtained affected efficient manufacture.

The next step involved the drawing of a detail design on heavy paper in actual size, with the construction parts shown in their proper places on the detail. This was carried on either under the direct supervision of the designer, or by the designer himself.

There were a number of reasons for the discarding of this practice but the chief reasons were the short life of the paper itself and the shortcomings of the designer as a construction expert. Being primarily an artist, his prime interest was to see that his original lines were preserved regardless of construction and production problems.

The drawings of the detail plan on paper is still common practice, and this plan is the basis of information for part identification, the working up of necessary production forms and jigs, and the development of the first cost record. The layout rod, however, is the master construction plan used in the plant for the actual production processes.

Two Types of Rods

There are two kinds of layout rods in general use. The one most commonly used is the detail rod previously referred to (See Figures 1, 2, and 3, page 3) and the other is the line rod, which only shows straight lines, with its item numbers showing items on the stock bill. Position, length, width, and thickness is shown through a medium of a single line.

UNIT H - TOPIC III

It would seem the rod evolved directly from the paper detial drawing and the practice of sending a board through with the paper plan, with the integral measurements written on its sanded side, as the job sent through its many operations. When it was discovered that this board, when coated with clear shellac over the written measurement, outlasted a number of paper drawings, the next logical step was to transfer the detail construction plan on to a similar board and then to combine both measurements and the plan on to the same board to furnish the layout rod as it is used today.

Rod Maker a Key Man

The layout rod maker is a key man in the modern woodworking plant. He must possess many other skills than that of drawing of construction parts on wood. He must be thoroughly versed in all the different phases of construction, machine operations and the standardization of construction parts. He must possess the knowledge of how to save material by making slight changes without altering the general style of the design. He must know cutting circles and limitations of standard equipment and be thoroughly familiar with mass production and cost control methods.

It can be plainly seen that the layout rod maker must be a paragon of virtues and skill to be able to satisfy the designer, the machine operator, and management and is definitely one of the Top Men of the industry.

The prime requisite of a layout rod is simplicity and clearness to allow the individual operator to find every item easily, and so the inexperienced workman can read and work from it.

Tool Requirements

The tools required for the preparation of the layout rod vary according to the whims of the individual rod maker but primary tools should include an eight foot steel rule (rigid, not folding), a steel mitre square, a large T-square, a complete set of angles (the 45° angle being used most frequently), a set of curves, a large compass, and a large drawing table surface. Equally important is the selection of pencils of a good grade as legibility is a prime virtue of the good rod. Aside from the traditional black, blue, green, red, and yellow are the standard colors used and extra hard and medium soft leads serve the purpose best.

Rod Construction

Unless plywood is used, the layout rod is made up of well-seasoned glued-up stock that will not warp or twist to cause distortion of the detail. The type of wood seems to vary, although dry, clear basswood seems to be quite popular. Other woods used are. poplar, linden, and maple. The thickness seems to be generally one-half inch.

The length and width of the layout rod is determined by the size of the piece to be drawn, but most plants try to make their rods of the same height to simplify handling. After the rod size has been determined the rod is jointed, squared true, planed and well sanded. It is most important that the rod be perfectly parallel in width, and truly square from both edges and at both ends.

All layout rods in one plant must be made in the same manner to avoid confusion. The purpose of the layout rod is to show the correct length, widths, sections, elevations,

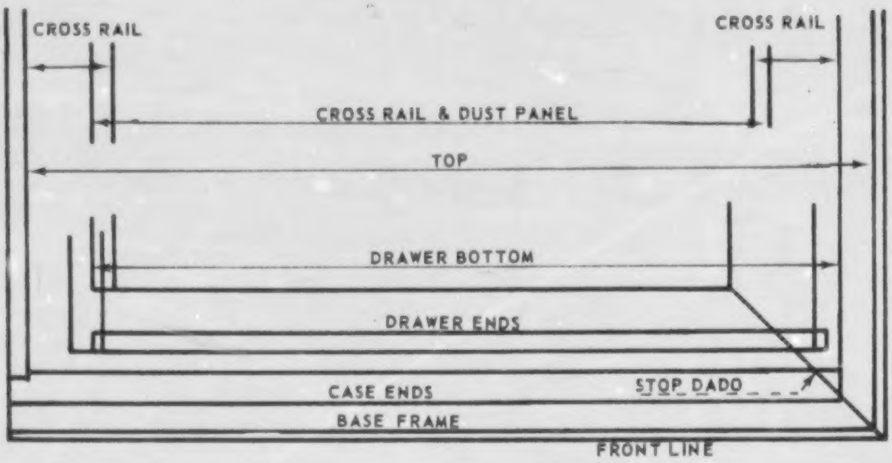

CROSS RAIL
CROSS RAIL
CROSS RAIL & DUST PANEL
TOP
DRAWER BOTTOM
DRAWER ENDS
STOP DADO
CASE ENDS
BASE FRAME
FRONT LINE

FIG. 1

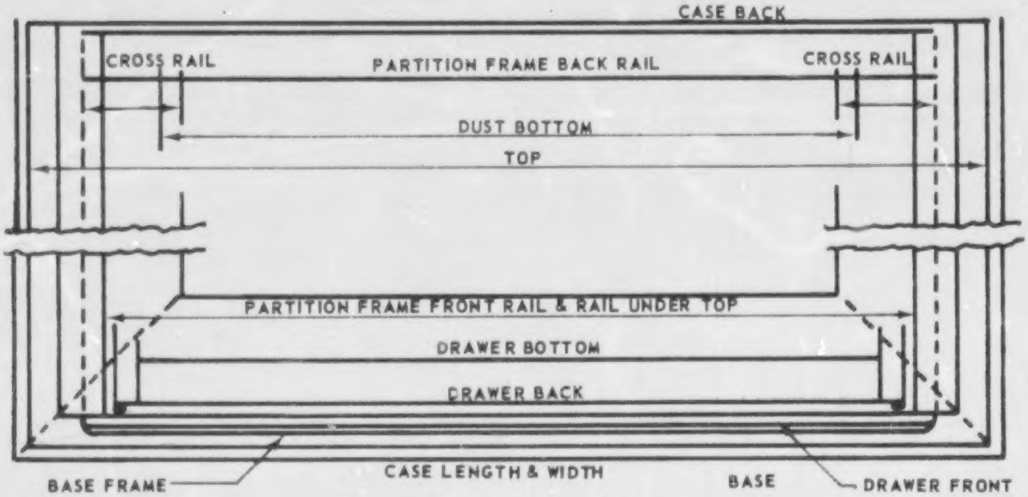

CASE BACK
CROSS RAIL
PARTITION FRAME BACK RAIL
CROSS RAIL
DUST BOTTOM
TOP
PARTITION FRAME FRONT RAIL & RAIL UNDER TOP
DRAWER BOTTOM
DRAWER BACK
BASE FRAME
CASE LENGTH & WIDTH
BASE
DRAWER FRONT

FIG. 2

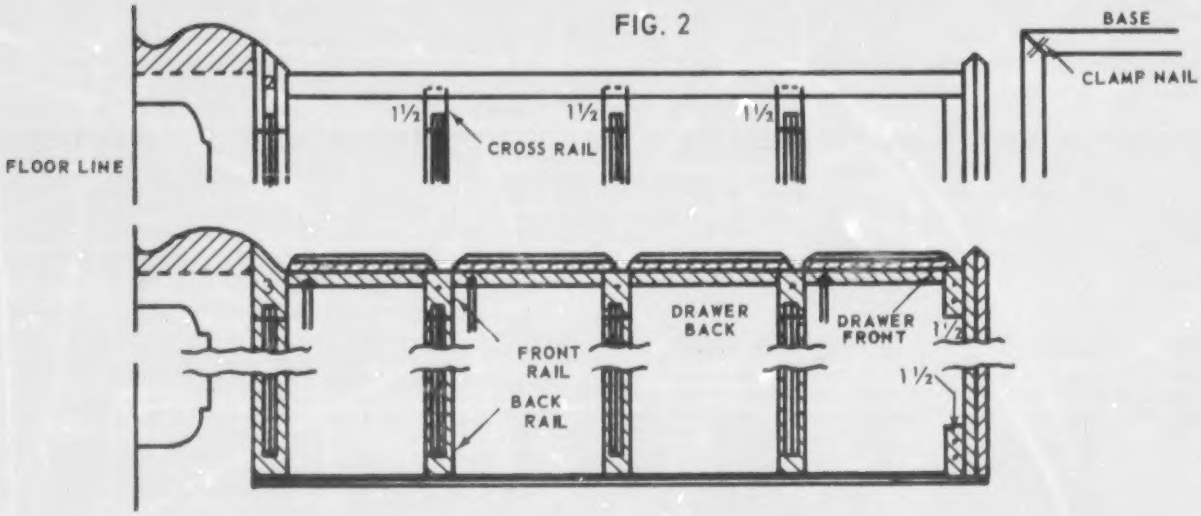

BASE
CLAMP NAIL
1½
1½
1½
CROSS RAIL
FLOOR LINE
DRAWER BACK
DRAWER FRONT
1½
FRONT RAIL
1½
BACK RAIL

FIG. 3

and plans, laid out in such a manner that the average workman finds them easy to understand. They are usually laid out so that when the operator turns the rods over the reverse side is facing him for easy reading.

Colored leads are used in many operations to make easier reading of various sections by cross-hatching them for identity as: metal parts--yelow, glass--green, plywood--red, etc., and this type of layout rod is called a "rainbow" rod. Usually in the general layout of a rod the depth and width are laid out on one side and the height on the other, but if the dimensions require it--the height and depth on one side, and the width on the other.

Some rod makers write the dimensions on the rod, but others intentionally leave off the written items as they feel the individual operator will check his stock to the rod itself for dimensions and be less liable to machine the stock to the wrong dimension.

In most plants, the rod makers show the size and location of the joinery--mortise, tenon, dowel, etc., but some believe these can be safely dispensed with, and by confining the rod maker's efforts to simple and quickly-made layout marks he can avoid a lot of work and economize in time.

After the completed rod has been coated with shellac or clear lacquer to preserve it, the rod maker usually makes out the stock bill, listing the rough and finished dimension of each item. If he has made a good rod, the stock bill will show a real economy in the material layout.

While the layout rod does not eliminate all patterns and jigs, it does eliminate the veritable forest of dimension patterns which used to clutter up the walls, shelves, and ceilings of our woodworking plants. Repair parts made from it are always identical as it does not shrink or distort measurements, and it has proven that it is more economical to erase a line on a layout rod before manufacture than to try to correct operations in the middle of a production run.

How to Make a Rod

The following example may be used for making a line rod for a bookcase, using a basswood board 8' long and 4" wide. Draw two lines the full length of the rod to show the overhang of top and thickness of face frame, both sides.

1. Height
    a. At the left-hand end strike off a line to indicate bottom of the bookcase.
    b. Above it in the same column strike off two more lines to show location of bottom shelf.
    c. Move along up to the top of the case using the same kind of lines to indicate the position of the door rails, stationary shelves, and top until the height layout is complete.

How to Make a Rod (continued)

2. Width

   a. Make a cross line near the left-hand end of the opposite side to lay out the width of the case.
   b. Make the next line far enough to the right to show the width of the front stile. Use dotted lines ~~for~~ the end of the case.
   c. Mark off the full overall width.
   d. Mark off the right-hand end of the bookcase and the other front stile. Indicate the widths of the door stiles.

3. Depth

   a. On the side with space, strike off the depth of the case from front to back.
   b. For paneled ends, show the location and width of each stile and the depth of the grooves.
   c. Layout the thickness of the front and back with dotted lines.

UNIT H - TOPIC III

LAYOUT TEST

1. A rod layout is made at: 1.________

    1. Quarter scale
    2. Full size
    3. Half scale
    4. A scale of 3" = 1'0"

2. If an error is made on a rod layout, the cabinetmaker should: 2.________

    1. Erase it and draw again
    2. Correct it with a heavier pencil
    3. Make a change during construction
    4. Plane it from the rod and redraw

3. The fourth face of a rod layout is: 3.________

    1. Never used
    2. Used to show types of fasteners
    3. Used to show drawers and doors
    4. Left blank for calculations

4. A panel layout starts from a(n): 4.________

    1. Common center point
    2. Edge of the panel
    3. Large circle
    4. Stock bill

5. On a panel layout a line of dashes indicates a: 5.________

    1. Temporary measurement
    2. Hardware location
    3. Hidden dimension
    4. Change in plans

6. Rod layout provides the cabinetmaker with a: 6.________

    1. List of materials
    2. Finish schedule
    3. Check of dimensions
    4. List of fasteners

7. Panel layout requires a knowledge of: 7.________

    1. Algebraic formulas
    2. Geometrical construction
    3. Wood glues
    4. Rod layout

8. A rod layout is begun at what point on the rod? 8.________

    1. One end
    2. Any point
    3. Middle
    4. A half inch from the end

9. Before a panel layout is made, which of the following must be drawn? 9. ________

1. Plan view, front elevation, and section detail
2. Section detail only
3. Front elevation only
4. Plan view only

10. A completed panel layout resembles what view of an object? 10. ________

1. Front elevation
2. End view
3. Plan view
4. Section through end

MILLWORK AND CABINETMAKING

UNIT H - TOPIC 3

Layout Stick -- Combination Square, Ruler, Pencil for each pair of students

LESSON OBJECTIVE:

To show apprentice how to lay out Desk 08.03.063 - 08.03.068

STUDY ASSIGNMENT:

Information sheet 08.03.06.01, 06.02

REFERENCES:

Lesson 08.03.05

IMPORTANT STUDY FACTORS:

Standardize layouts and make them understandable to everyone

WORK ASSIGNMENT:

Layout and bill in Desk 08.03.063.
Make layout for either letter or legal size files.

INTRODUCTION TO NEXT LESSON:

Introduce Workbook, "Building Trades Blueprint Reading, Part I Fundamentals," by Dalzell

MILLWORK AND CABINETMAKING

Information Sheet

UNIT H - TOPIC 3

Layout

Steps (1) Shop order and proper detail
Proper detail involves structurally feasible hardware, indicated and available; materials spelled out and available; dimensions required; appliance sizes

(2) Order hardware and plastic laminate if not in stock

(3) Obtain layout board or stick. Prefer stick approximately 4" to 5" wide that will contain the three major layouts: width--height--depth or longer if extra layout sections are needed

(4) Use combination square set for top overhang and scribe a line on both sides of the stick. Next scribe a line indicating the thickness of the logs.

Lay out the cabinet for width, indicating all lines coming off the front edges you would see on a plan view.

Lay out the cabinet for height indicating all lines visible on the front edge of a section view.

Lay out the cabinet for depth indicating all lines visible on a plan view of the end.

Best to draw the lines to make the layout look like a complete full-size sectional detail of these parts.

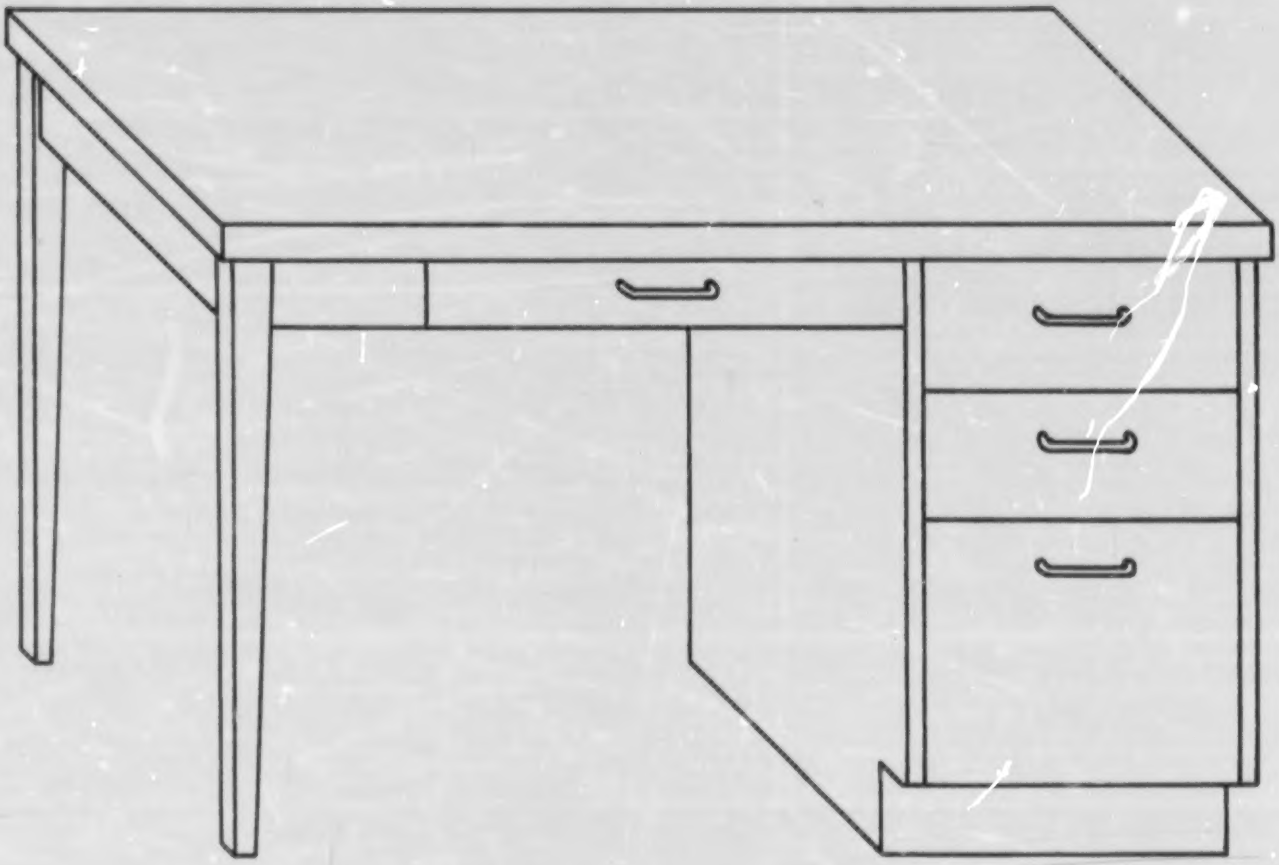
(5) During layout procedure always consider the following:

a) Reason for cabinet

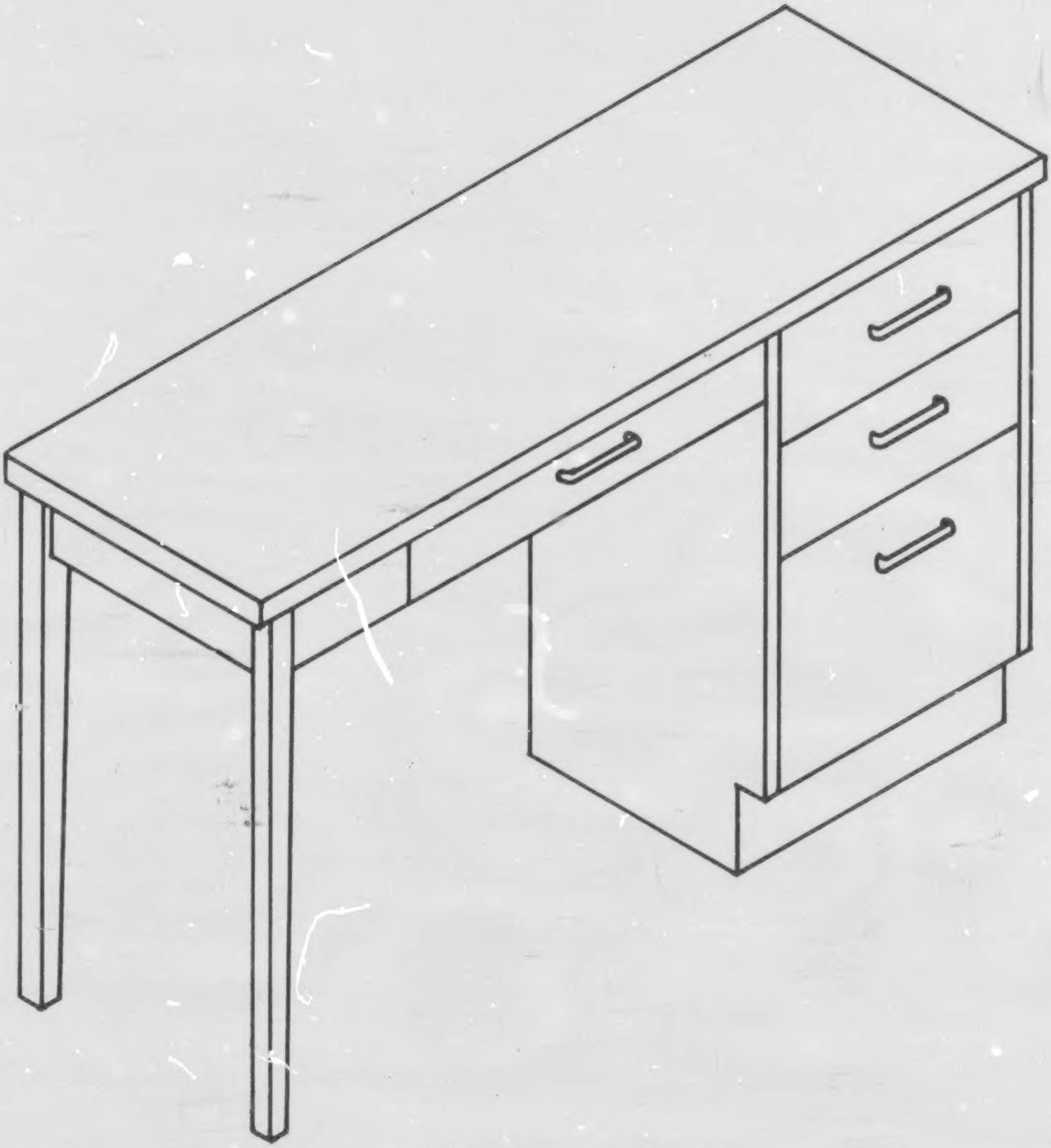
b) Space to be filled

for width
for depth
vertically

c) Indicate walls, floor, ceiling lines on layout, with existing conditions, notches, soffits, pipes, trim, and electrical

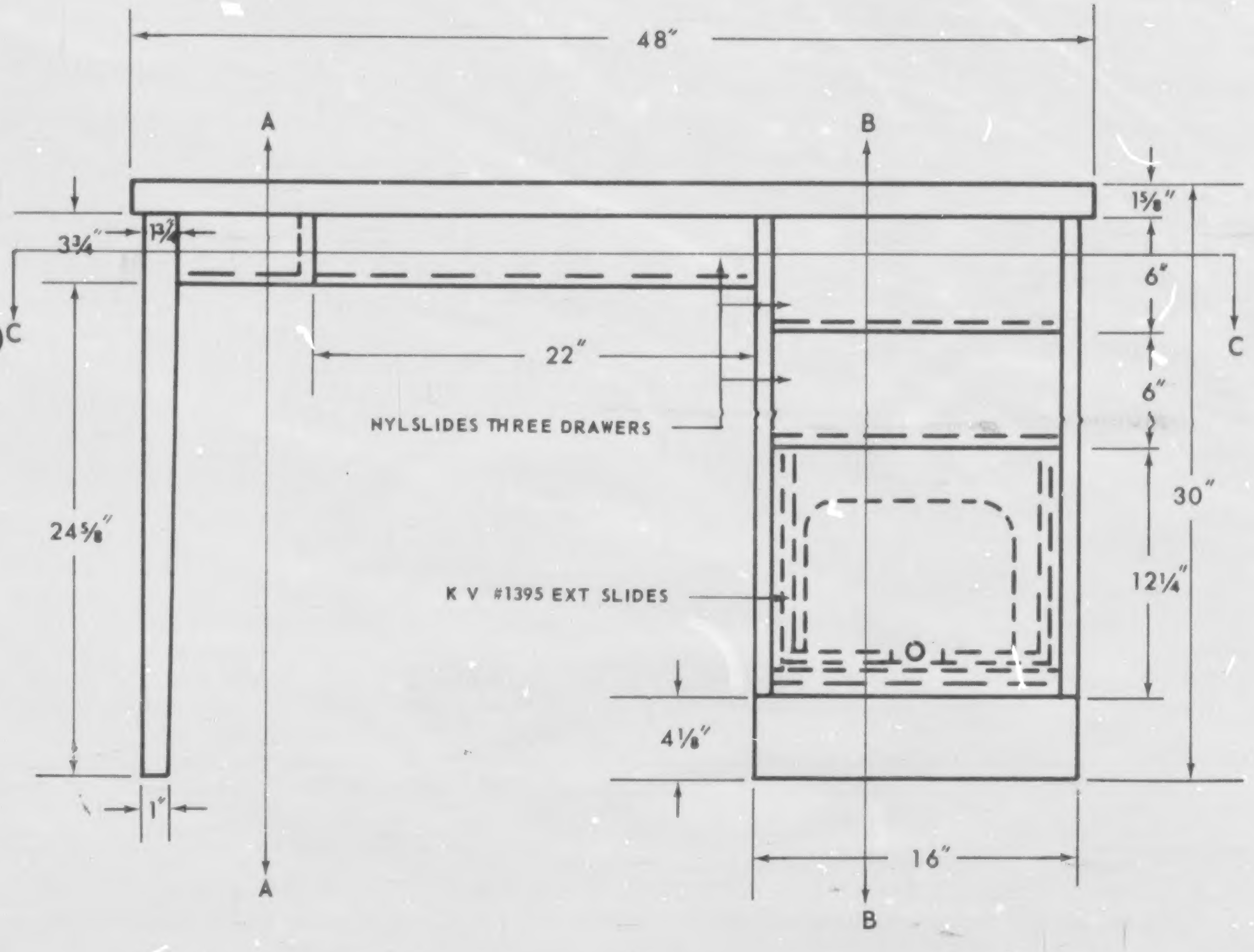


ISOMETRIC

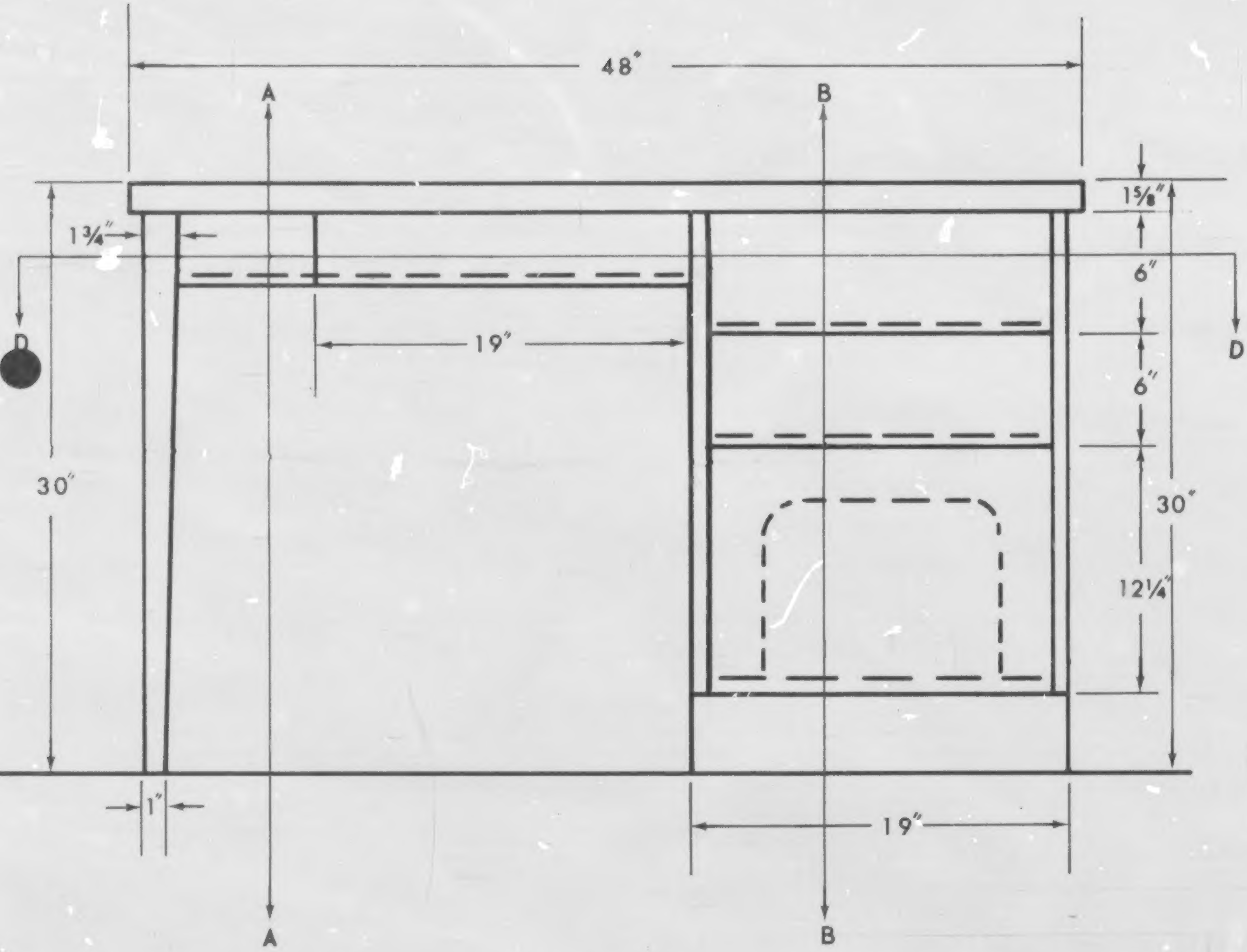


ISOMETRIC

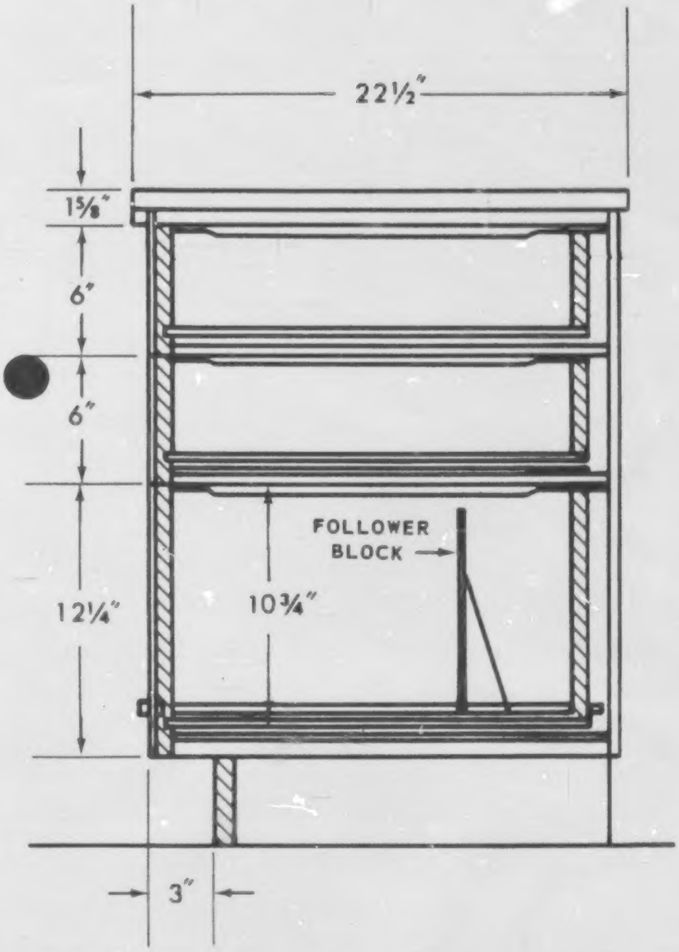
ELEVATION LETTER SIZE FILE


48"
A
B
1⅝"
3¾"
1¾"
C
6"
C
6"
22"
NYLSLIDES THREE DRAWERS
30"
24⅝"
K V #1395 EXT SLIDES
12¼"
4⅛"
1"
16"
A
B

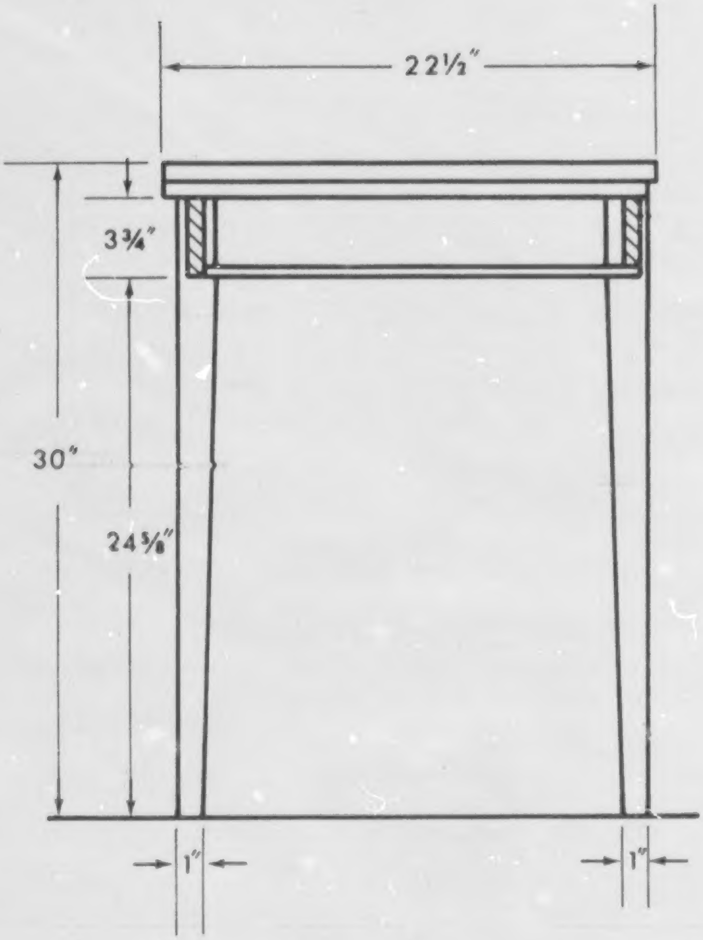
ELEVATION LEGAL SIZE FILE

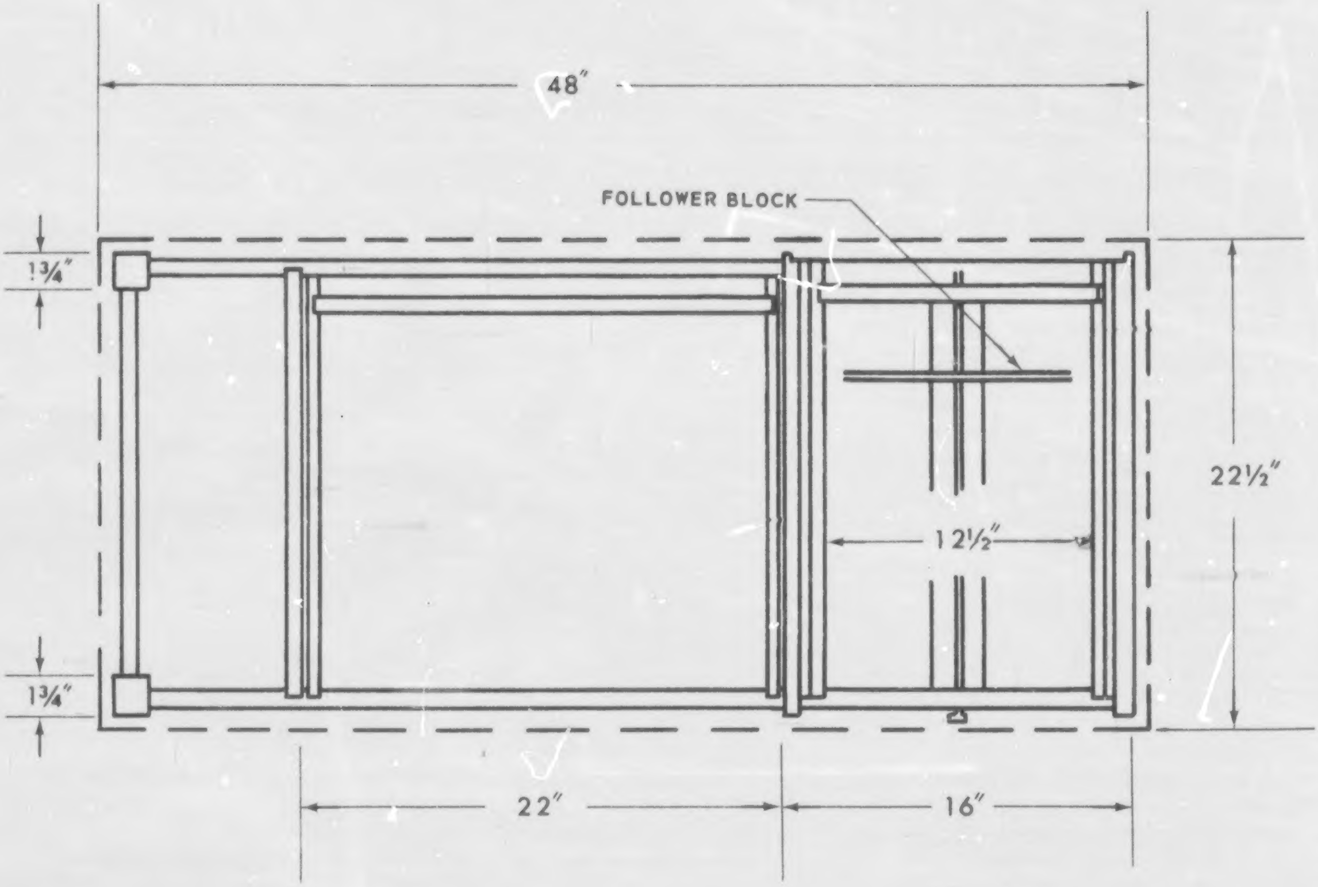

48"
A
B
1⅝"
1¾"
6"
D
D
19"
6"
30"
30"
12¼"
1"
19"
A
B

SECTION A A

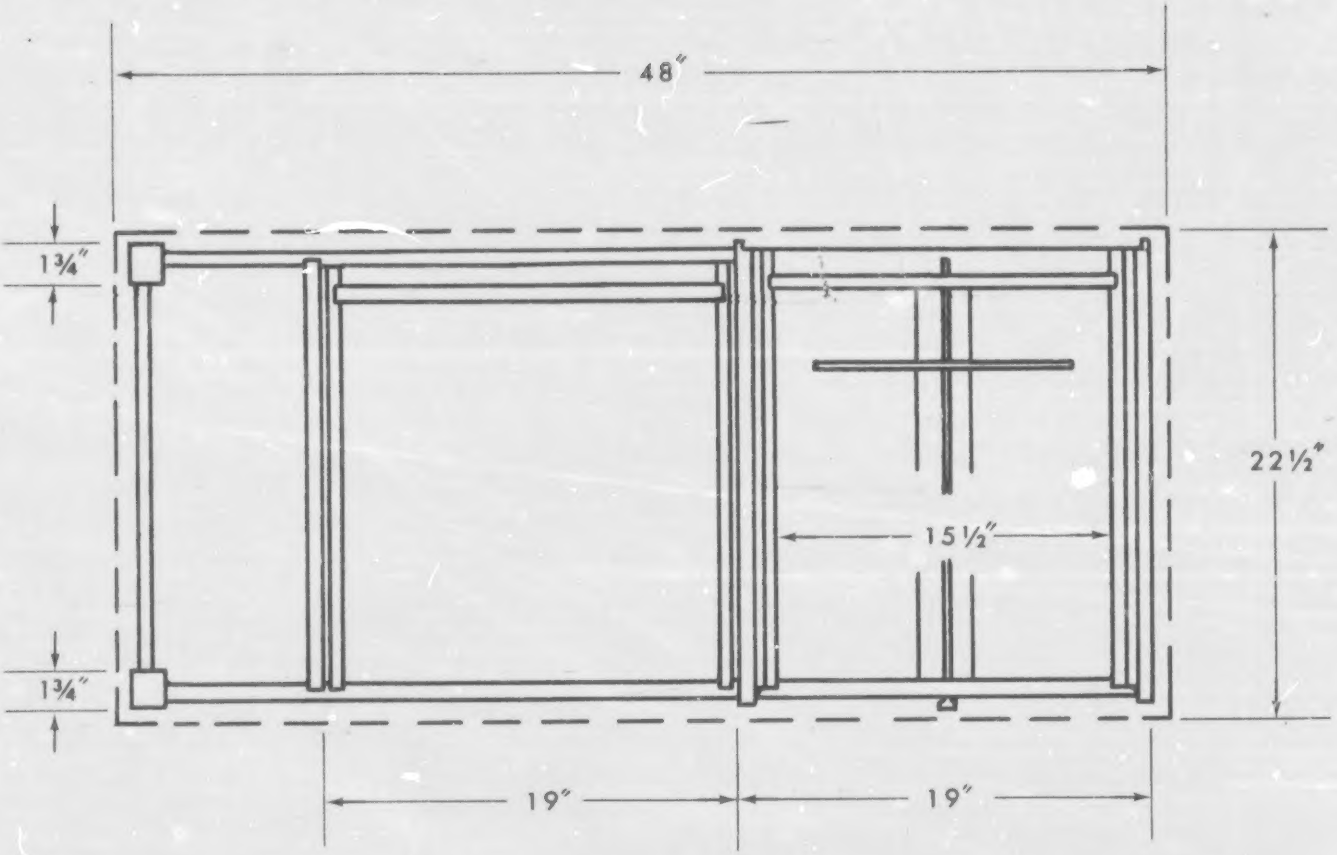

22½"
1⅝"
6"
6"
12¼"
10¾"
FOLLOWER BLOCK
3"

SECTION B B


22½"
3¾"
30"
24⅝"
1"
1"


48"
FOLLOWER BLOCK
1¾"
1¾"
22½"
12½"
22"
16"

SECTION C C


48″
1¾″
1¾″
22½″
15½″
19″
19″

SECTION D D

CABINETMAKING AND MILLWORK

TOPIC:

LESSON OBJECTIVE:

To introduce basic working drawings to the apprentice.

STUDY ASSIGNMENT:

Building Trades Blueprint Reading, Part I, by Dalzell. pp 5 through 29.

IMPORTANT STUDY FACTORS:

Visualize the mass detailed.
Relate details to your own knowledge and experience.

REFERENCES:

Architectural Drawing for the Building Trades, Joseph E. Kenny & John P. McGrail.

WORK ASSIGNMENT:

Answer questions on scratch paper for:

Test No. 1, Page 11
Test No. 2, Page 17
Test No. 3, Page 27

Students exchange test answers for grading.
Individually answer questions as called upon by instructor.

INTRODUCTION TO NEXT LESSON:

Building Trades Blueprint Reading, Part I, by Dalzell, pp. 29 to 57.

CABINETMAKING AND MILLWORK

TOPIC:

LESSON OBJECTIVE:

Introduction to plan views with some common symbols and conventions for the apprentice.

STUDY ASSIGNMENT:

Building Trades blueprint reading, Part 1, by Dalzell, pp 29-57

REFERENCES:

Architectural Drawing for the Building Trades, by Kenney and McGrail.

WORK ASSIGNMENT:

Answer questions on scratch paper for Test #4, page 37.
    For Test $5, page 53.
Students exchange answer sheets for grading.
Individually answer questions as called upon by the instructor.

INTRODUCTION TO NEXT LESSON:

Building Trades Blueprint Reading, part 1, by Dalzell., Study pp 57-97.

CABINETMAKING AND MILLWORK

TOPIC:

LESSON OBJECTIVE:

To introduce the apprentice to dimensioning and sealing, and structural details.

STUDY ASSIGNMENT:

Building Trades Blueprint Reading, Part I, by Dalzell, pp 57-97.

REFERENCES:

Architectural Drawing for the Building Trades, Kenny and McGrail

WORK ASSIGNMENT:

Answer questions on scratch paper for Test No. 6, page 69.
    Test No. 7, Page 93.
Students exchange test answers for grading.
Individually answer questions as called upon by the instructor.

INTRODUCTION TO NEXT LESSON:

Building Trades Blueprint Reading, Part I, by Dalzell, pp 97-121.

CABINETMAKING AND MILLWORK

TOPIC:

LESSON OBJECTIVE:

To acquaint the apprentice with the basics of survey and plot plans.
To reveal regional variations.
To take final examination on Book 1.

STUDY ASSIGNMENT:

Building Trades Blueprint Reading, Pages 98-128.

IMPORTANT STUDY FACTORS:

Concentrate upon grade line interpretation as to grade--can be very important in installation of cabinets.
Study sections with particular regard to the installation of cabinets and trim.

REFERENCES:

Architectural Drawing for the Building Trades, by Kenny and McGrail.

WORK ASSIGNMENT:

Answer questions on scratch paper for:
    Test #8, page 103-4.
    Test #9, page 113-4.
For final examination, pages 117 to 120.
Students exchange test answers for grading.
Individually answer questions as called upon by the instructor.
Turn in graded final tests.

INTRODUCTION TO NEXT LESSON:

Building Trades Blueprint Reading, Part II, pp 1 - 27.

CABINETMAKING AND MILLWORK

TOPIC:

LESSON OBJECTIVE:

To introduce new materials and construction and to learn to read supplementary material.

STUDY ASSIGNMENT:

Building Trades Blueprint Reading, Part II, by Dalzell, pp. 1 - 27.

REFERENCES:

Architectural Drawing for the Building Trades, by Kenny and McGrail.

WORK ASSIGNMENT:

Answer questions on scratch paper for:

Test #1, pp. 11 - 12.
Test #2, pp. 23 - 24.
Test #3, pp. 27 - 28.

Students exchange test answers for grading.
Individually answer questions as called upon by the instructor.

INTRODUCTION TO NEXT LESSON:

Building Trades Blueprint Reading, Part II, by Dalzell, pps. 29 - 45.

CABINETMAKING AND MILLWORK

TOPIC:

LESSON OBJECTIVE:

To introduce commercial structure details.
Study common practices.

STUDY ASSIGNMENT:

Building Trades Blueprint Reading, Part II, by Dalzell, pp. 28 - 45.

IMPORTANT STUDY FACTORS:

Read and interpret structural steel designations.

REFERENCES:

Architectural Drawing for the Building Trades, Kenny and McGrail.

WORK ASSIGNMENT:

Answer questions on scratch paper for:

Test # 4A, pp. 43 - 44.
Test #4B, pp. 45 - 46.

Students exchange test answers for grading.
Individually answer questions as called upon by the instructor.

INTRODUCTION TO NEXT LESSON:

Building Trades Blueprint Reading, Part II, by Dalzell, ;;. 47 - 83.

CABINETMAKING AND MILLWORK

TOPIC:

LESSON OBJECTIVE:

To learn the proper procedure to study a plan.
To learn how plans are adapted to materails used and how they are used.

STUDY ASSIGNMENT:

Building Trades Blueprint Reading, Part II, by Dalzell, pps. 47 - 83.

IMPORTANT STUDY FACTORS:

Differences in brick walls.
Study the three variations of plans.
Digest the information in the specifications.

REFERENCES:

Architectural Drawing for the Building Trades, by Kenny and McGrail.

WORK ASSIGNMENT:

Answer questions on scratch paper for:

Test #5A, pps. 77-78.
Test #5B, pp. 79-80.
Test 6A, pp. 81-82.

Students exchange test answers for grading.
Individually answer questions as called upon by the instructor.

INTODUCTION TO NEXT LESSON:

Building Trades Blueprint Reading, by Dalzell, pps. 83 - 99.

CABINETMAKING AND MILLWORK

TOPIC:

LESSON OBJECTIVE:

To complete examination and review exams

STUDY ASSIGNMENT:

Building Trades Blueprint Reading by Dalzell, pp. 83-99

REFERENCES:

Architectural Drawing for the Building Trades, Joseph E. Kenny and John P. McGrail

WORK ASSIGNMENT:

Answer questions on scratch paper.
For Test #6B, page 82
For Test #6C, pp. 83-84
Review Tests #1, 2, and 3, pp. 93-99
Students exchange answer sheets for grading
Individually answer questions as called upon by instructor

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

TOPIC:

LESSON OBJECTIVE:

Review Blueprint Reading Sections in the California Course.

STUDY ASSIGNMENT:

California Workbook I, Unit B, pps. 100 - 109.
California Workbook II, Unit B, pp. 9 - 25.
California Workbook III, Unit G, pp. 101 - 113.

REFERENCES:

Architectural Drawing for the Building Trades, Kenny and McGrail.

WORK ASSIGNMENT:

California Test Book I, Unit G, pp. 95 - 98.
California Test Book II, Unit B, pp. 18 - 26.
California Test Book III, Unit G, pp. 49 - 53.

Instructor will ask students for answers to questions during class.
Students will put their names on tests, grade and return to instructor.

INTRODUCTION TO NEXT LESSON:

California Workbook II, Unit F, pp. 69 - 72.
California Testbook II, Unit F, pp. 69 - 77.

MILLWORK AND CABINETMAKING

UNIT H - TOPIC 5

Windows, Frames, and Sash

LESSON OBJECTIVE:

To acquaint the apprentice with types of sash and windows and construction of same.

STUDY ASSIGNMENT:

United Brotherhood of Carpenters and Joiners, Unit VIII, pp. 12-20

REFERENCES:

Cabinetmaking & Millwork by Dahl & Wilson, pp. 270-287
Interior & Exterior Trim, Delmar Publishers, pp. 71-74

IMPORTANT STUDY FACTORS:

Study metal window catalogs to compare with wood windows.

WORK ASSIGNMENT:

Study U.B.C. Unit VIII, pp. 12-20.
Answer questions on scratch paper for class correcting
Study Cabinetmaking and Millwork, pp. 270-287. Answer questions on p. 287
California Workbook II, pp. 65-74
California Testbook II, pp. 71-79; pp. 102-110
Answer questions on scratch paper for class grading

INTRODUCTION TO NEXT LESSON:

Cabinetmaking & Millwork, Dahl & Wilson, pp. 289-304, Window and Sash Frames

UNIT H - TOPIC 5

Window and Sash Frames

LESSON OBJECTIVE:

To show the Apprentice how wood frames are built for wood and metal windows and sash.

STUDY ASSIGNMENT:

United Brother hood of Carpenters, Unit VIII, pp. 1-6

REFERENCES:

Interior and Exterior Trim, Delmar Publishers, pp. 53-60, pp. 61-67, pp. 71-74

IMPORTANT STUDY FACTORS:

Make the Apprentice relate his own experiences with the problems to the class.

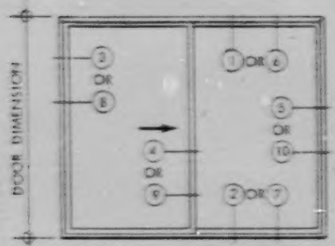
WORK ASSIGNMENT:

Cabinetmaking & Millwork, Dahl & Wilson, pp. 268-304. Answer questions on
p. 304 on scratch paper for class grading.
California Course, Workbook, Book II, pp. 65-73
California Course, Testbook II, pp. 69-77
Answer questions on scratch paper for class grading

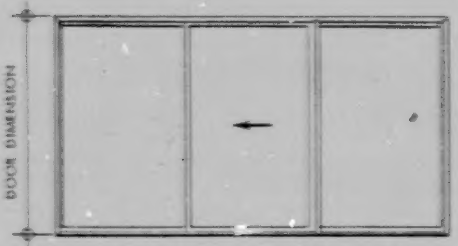
INTRODUCTION TO NEXT LESSON:

Doors and Frames, U.B.C., Unit VIII, pp. 21-34

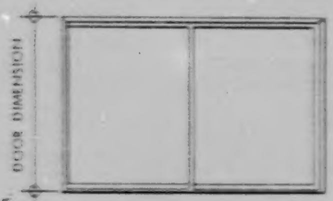
(3) Sliding Glass


DOOR DIMENSION
3
OR
8
1 OR 6
5
OR
10
4
OR
9
2 OR 7

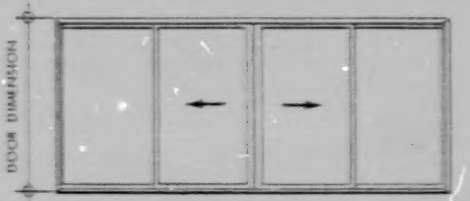
XO SHOWN (OX OPPOSITE)


DOOR DIMENSION

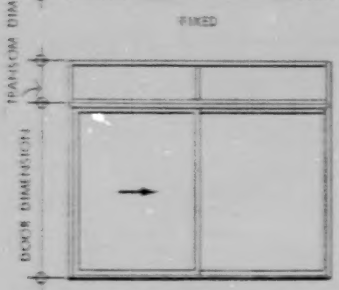
OXO RH SHOWN (OXO LH OPPOSITE)


DOOR DIMENSION

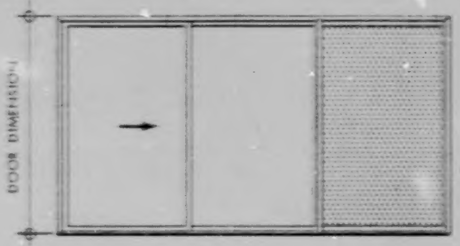
FIXED


DOOR DIMENSION

OXXO

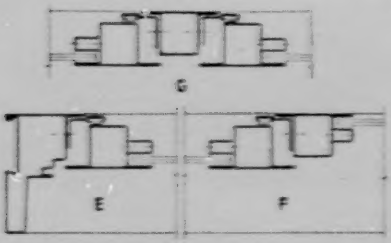

TRANSOM DIM.
DOOR DIMENSION

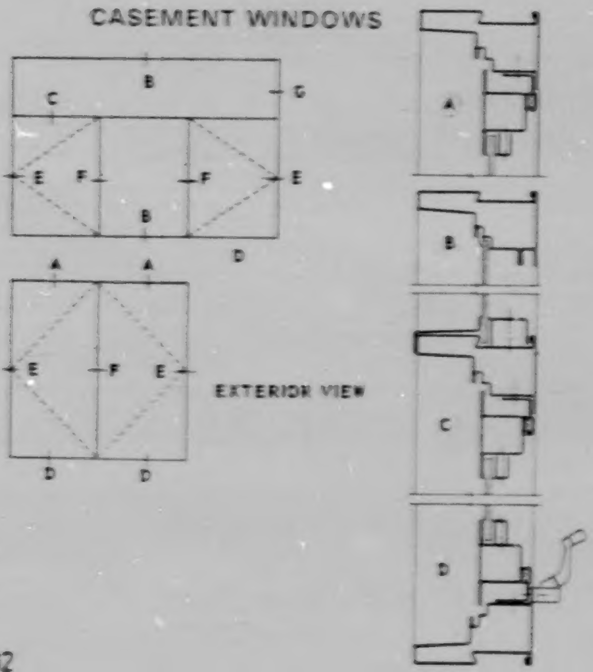
XO WITH TRANSOM


DOOR DIMENSION

XO WITH PANEL

(4) Casement Windows




CASEMENT WINDOWS
B
C
G
E
F
F
E
B
D
A
A
E
F
E
EXTERIOR VIEW
D
D
A
B
C
D

DOUBLE HUNG WINDOW DETAILS

Spec. No. DH-A3H

—All aluminum windows of the types and sizes shown in the plans and/or as called for in this specification shall be furnished with all necessary hardware, anchors, and miscellaneous equipment as herein specified and shall be manufactured by Porterfield Industries, Inc., Miami, Florida and shall conform to Architectural Aluminum Manufacturers Association Specification DH-A3H.

—All extruded frame and sash members shall be 6063-T5 aluminum alloy. Aluminum extrusions shall have a guaranteed minimum yield of 16,000 p.s.i. and a minimum ultimate tensile strength of 22,000 p.s.i.

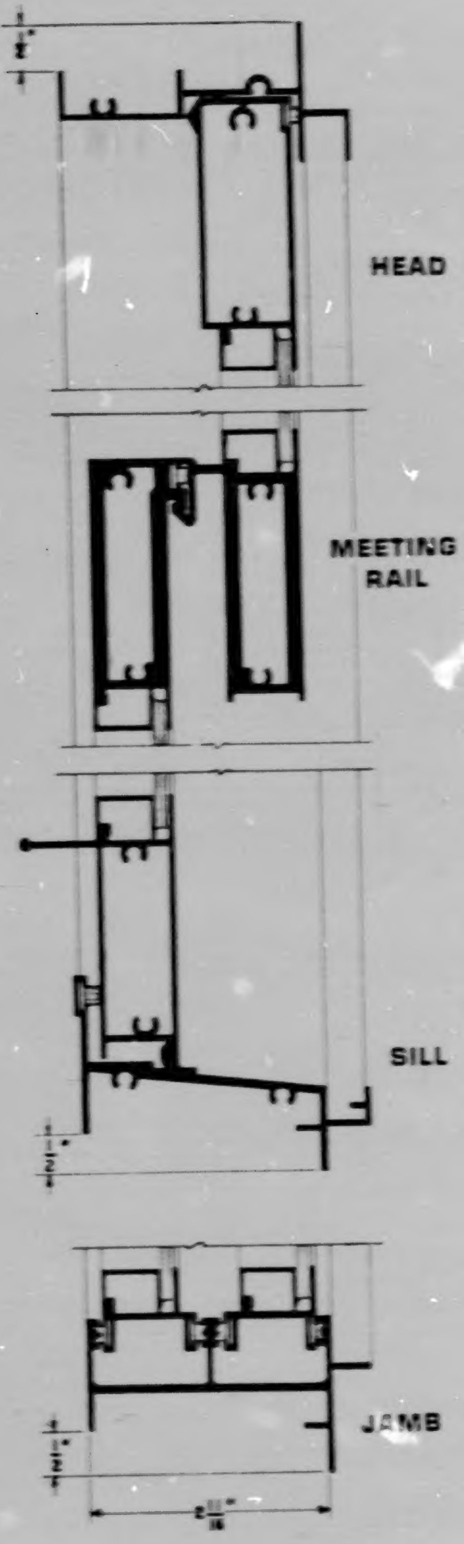
—Windows shall be fitted with adjustable spiral sash balances. Balances shall be guaranteed by their manufacturer for the life of the window. Locking hardware shall be white bronze or non-magnetic stainless steel or a combination of these materials. All windows over 3 feet wide shall be fitted with two latches. Pull downs shall be supplied on upper sash. Lower sash shall have an integrally extruded continuous lift.

—All vertical members shall be fitted with silicon treated wool pile fabric in aluminum backing on both exterior and interior faces to properly contact main frame. Horizontal sash members shall be fitted with the same material. Lower sash rail of lower vent shall be weatherstripped with elastomeric vinyl in compression with the main frame sill. Joints in main frame shall be sealed with butyl compound.

—All windows shall be glazed with glass from the interior. Glass shall be back bedded with butyl compound. Glass shall be retained by aluminum snap-in bead.

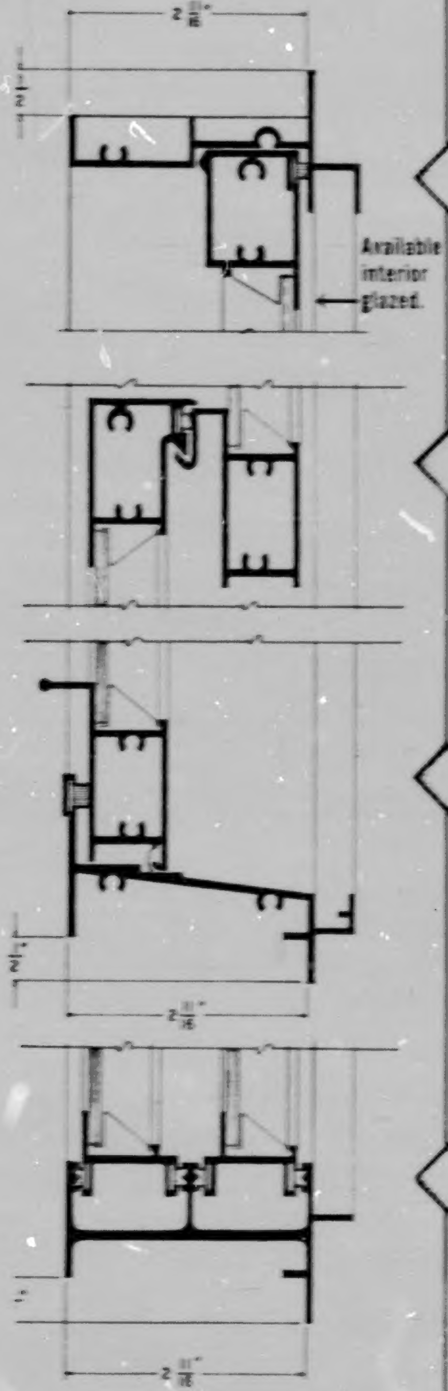
—Frame members shall have a minimum depth of 3-3/16" and a minimum wall thickness of .085 through the main web. Frame jambs shall be of one piece construction. Sash members shall have a minimum depth of 1-1/16" and shall have a glass rebate of ¾" x ½" arranged for inside glazing. Horizontal members of all sash shall be of tubular construction with a minimum section of ⅞" x 2⅜".

—A window 5'6" x 10'0" shall have passed the water infiltration test in conformance with Architectural Aluminum Manufacturers Association Specifications for DH-A3H windows.

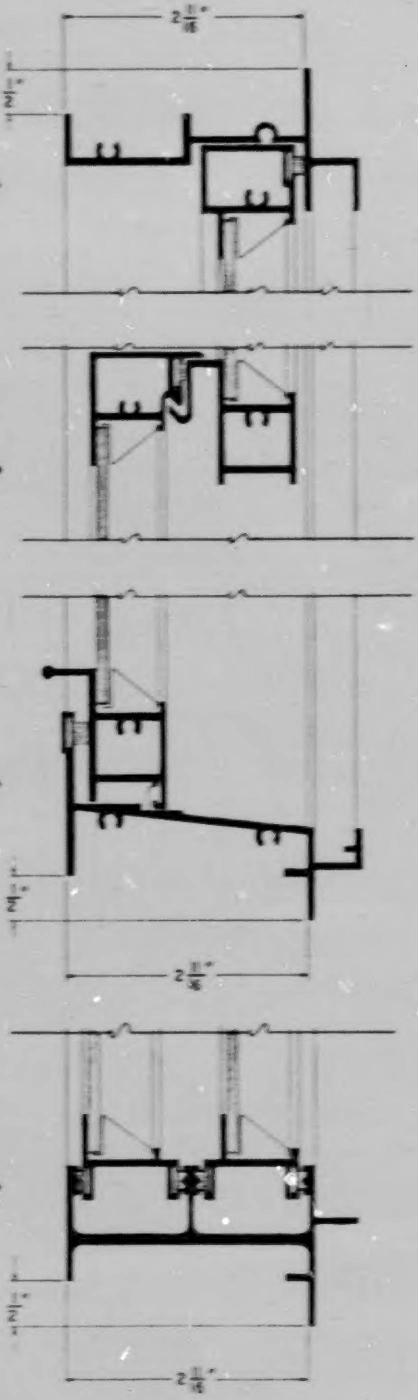


DOUBLE HUNG WINDOW DETAILS

SPEC. NO. DH-A2H


2 11/16"
2 1/2"
Available interior glazed.
2 1/2"
2 11/16"
2 11/16"

SPEC. NO. DH-A1H


2 11/16"
2 1/2"
2 1/2"
2 11/16"
2 1/2"
2 11/16"

HEAD

MEETING RAIL

SILL

JAMB

HALF SIZE

INFORMATION SHEET

UNIT H - TOPIC 5

Windows, Metal-framed and wood frames

Metal windows have in most cases replaced the wood sash in the residential field of building in the Northwest. The main reason for this is the low purchase and installation price, with low maintenance as another factor.

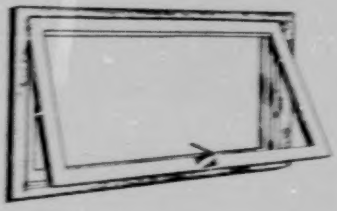
Many architects will specify wood sash and frames in the more expensive houses or a combination of wood frame and metal sash with stopped glass for a pleasing and yet economical window wall.

Many schools and stores still are built with wood supporting frames enclosing stopped glass and metal frames.

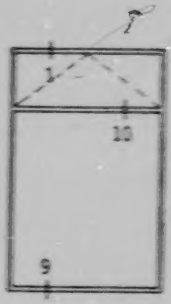
The metal frame window, although popular in the Northwest and in warmer climates, has some serious drawback in certain areas.

The sash comes in a variety of styles and openings: fixed, sliding, awning, casement, or vertically pivoted.

(1) Awning

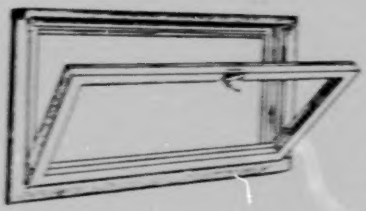


Sash inswinging from top or bottom

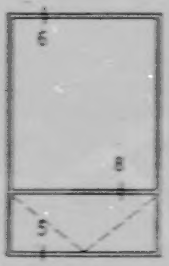


AWNING
FIXED GLASS

(2) Hopper

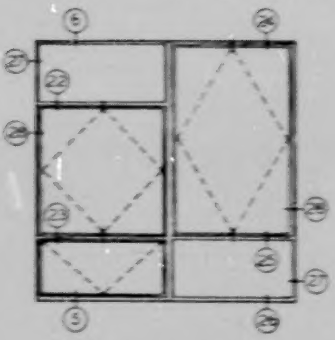


Holds sash open in 3 positions.



FIXED GLASS
HOPPER

Vertically pivoted



These are:

Weeping in high moisture or cold areas
The inability of metal to insulate the area around the glass
Rusting in steel and corrosion in aluminum
Areas around salt water and of cold winters are still using the wood sash for their light and ventilation.

This unit will cover both wood and metal sash and a combination of both.

The information sheet on double-hung window in this unit may at first glance seem not applicable and out of date to some students.

Keep in mind the nomenclature is the same in most frames--both wood and metal--though many companies both detail and stock wood windows. Today they may use modern hardware and slides, but the parts are still the same; i.e., sill, stile, rail, mullion.

Many of you in the next ten years will have become foremen and superintendents and will have worked in a number of different shops and areas.

Learn the basis of sash and window frame construction. In the field of remodeling, the repair and/or replacement of windows is part of the journeyman millman's job.

METAL SASH

If you are required to take off blueprints and/or build frames glass, metal, or wood sash, or any combination thereof, remember these basic points:

(1) Outside dimensions of sash frame
(2) Thickness of frame
(3) Types of hardware and clearance needs
(4) Thickness of wall, type of wall or partition
(5) Whether bearing or non-bearing

If you are using metal sash frame in wooden stopped frames, remember most metal frames are manufactured with a nailing strip or blind stop. This will change opening size in stopped frame and may have to be removed.

Details of metal sash can be found in such publications as Architectural Catalog, file, or from the manufacturer.

Remember the proper fitting of metal or wood sash to frames you have manufactured is your responsibility.

MILLWORK AND CABINETMAKING

UNIT H - TOPIC 5

Cellar Sash and Casements

LESSON OBJECTIVE:

To acquaint the apprentice with the different kinds and construction of cellar sash and frames and casement sash and frames.

STUDY ASSIGNMENT:

1. Suggested Unit Course in Interior and Exterior Trim, pp. 53-67
2. Architectural Drawing for the Building Trades, pp. 64-67

REFERENCES:

1. Suggested Unit Course in Interior and Exterior Trim, by Delmar Publishers
2. Architectural Drawing for the Building Trades, by Kenney and McGrail

IMPORTANT STUDY FACTORS:

1. Be able to identify and describe a single-hung frame.
2. Learn which parts are rabbeted in a cellar frame.
3. Know the approximate pitch of the sill in a cellar frame.
4. Learn the types of wood casement frames used.
5. Know what slope to use on a casement frame.
6. Know where to install the stool on an inswinging casement sash and an outswinging casement sash.
7. Learn how to install a double sash in a casement sash.
8. Learn where to use a drip cap on a casement sash.
9. Know what type of a screen to use on an outswinging casement sash.

WORK ASSIGNMENT:

1. Single-hung frames are made to hold a ____________________ sash.
2. The ______________ and ______________ jamb members are rabbeted on both edges.
3. The slope on a basement sill is between ________ and ________ degrees.

4. The two types of wood casement frames are the ____________ and ________________ sash frames.

5. The slope on a casement frame is between __________ and _______ degrees.

6. The stool is installed in the ____________ of the sash on an inswinging casement sash.

7. A double casement outswinging sash is ______________ to the side jambs and an _______________ is placed in the _________________ of one sash at the meeting place.

8. A drip cap is used on an ___________________ casement sash. It is placed on the bottom and ___________________ of the sash.

9. On an outswinging casement sash a _____________ or _______________ screen is used.

INTRODUCTION TO NEXT LESSON:

MILLWORK AND CABINETMAKING

UNIT H - TOPIC 5

Window Frames (Kinds and Construction)

LESSON OBJECTIVE:

To acquaint the apprentice with the different kinds and constructions of window frames.

STUDY ASSIGNMENT:

1. Suggested Unit Course in Interior and Exterior Trim, pp. 53-74
2. Architectural Drawing for the Building Trades, pp. 58-63
3. Audels Carpenters and Builders Guide #4, Graham and Emery

REFERENCES:

1. Suggested Unit Course in Interior and Exterior Trim, Delmar Publishers
2. Architectural Drawing for the Building Trades, Kenney and McGrail
3. Audels Carpenters and Builders Guide #4, Graham and Emery

IMPORTANT STUDY FACTORS:

1. Learn the essential parts of a window frame.

2. Know the parts of a window frame that make up the outside finish.

3. Determine the slope on a sill in a frame.

4. Learn how to determine the size of the opening in a frame for a doublehung, 2-light window.

5. Learn how many openings a triple mullion frame has.

6. Find out how many windows go in a double-hung window frame.

7. Learn what part the parting strip plays in a window frame.

8. Determine the classification of semi-circular window frames.

9. Learn the three most common frame constructions.

WORK ASSIGNMENT: (complete the following statements)

1. The essential parts in a window frame are the ________________, ____________, ______________________________, and ________________________.

2. The outside finish consists of ______________________ at the top and sides and a ____________________________.

UNIT H - TOPIC 5

WORK ASSIGNMENT: (cont'd.)

3. The slope on a window sill is between ____________ and __________ degrees.

4. The width of the opening in the frame is decided by the ________________ of the ____________ plus the ________________ allowance on both ________________. The heighth of the opening is determined by the sum of the ____________ and ________________ glass plus the ________________ rail, the ____________ rail, and the ________ rail.

5. The triple mullion frame has ________________ openings.

6. ________________ windows go into a double-hung window frame.

7. The ________________ acts as a guide and also keeps the windows apart as they slide past each other.

8. ____________________ window frames are classified as special types of frames.

9. The three most common frame constructions are the ________________ ____________ frame, the ____________________ frame, and the ______________________ frame.

INTRODUCTION TO NEXT LESSON:

UNIT H - TOPIC 5

Window Frames (Kinds and Construction) (Cont'd.)

LESSON OBJECTIVE:

To acquaint the apprentice with the kinds of window frames and their construction.

STUDY ASSIGNMENT:

Read complete Information Sheet for Lesson 64

REFERENCES:

Information Sheet for Lesson 64

IMPORTANT STUDY FACTORS:

1. Be able to draw and label a typical window frame.
2. Be able to describe the difference between a window with a single sill and one with a double sill.
3. Learn how to make out a typical working bill.
4. Learn how to make out a typical cutting bill for a window frame.
5. Be able to draw and name the pieces involved in the construction of window frames.

WORK ASSIGNMENT: (Complete the following statements)

1. In order to lay out a window frame the construction of the building, particularly the ____________________ of the ________________________________, ______________________________ and ______________________ must be known.
2. The head jamb is the same in detail as the ______________________________.
3. In the working bill an allowance of ___________ inch in __________________ is made.
4. Openings for the pulleys are cut on a _________________________ machine.
5. The parting strips are inserted in a __________ x ________ inch ____________ groove.

UNIT H- TOPIC 5

Window Frames (Kinds and Construction)

WORK ASSIGNMENT (cont'd.)

6. Frames for plain-rail windows differ from frames having check-rails, as the parting strips of the former are ______________________ and a different arrangement of ____________________ is employed.

7. Draw a double sill and describe the difference from a single sill, giving advantages or disadvantages.

INTRODUCTION TO NEXT LESSON:

UNIT H - TOPIC 5

Window Frames (Kinds and Construction)

INFORMATION SHEET

Kinds: Window frames may be made and assembled at the factory or mill and brought to the building site ready for installation or they may be sent in package form, knocked down (K.D.). A knowledge of the various shapes and standard sizes of windows and frames is necessary before construction begins. The materials used should be standard size, and due to the requirement of insulation against wind, rain, dust, and snow, the construction should be the best possible. Window frames may be grouped in six general kinds; single-hung, double-hung, mullion, semi-circular, casement, and transom.

1. Window Frames for Stuccoed Frame Building:

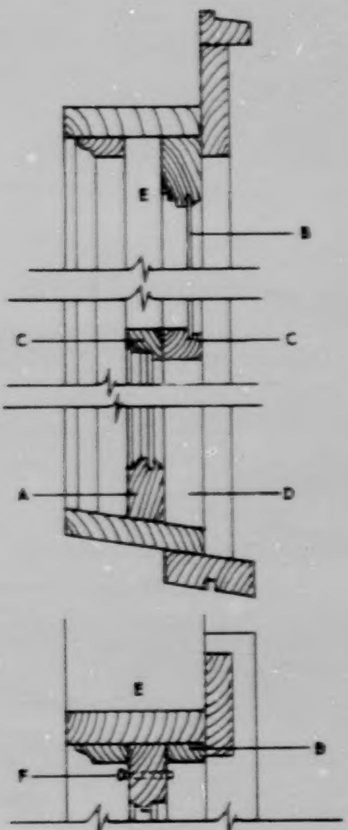


FIGURE 1

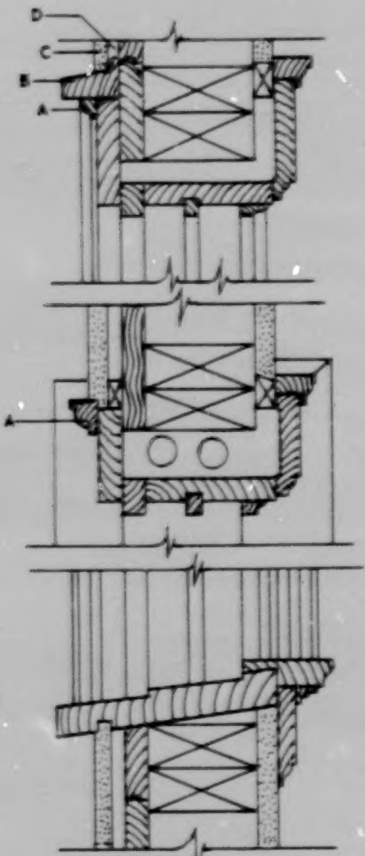


FIGURE 2

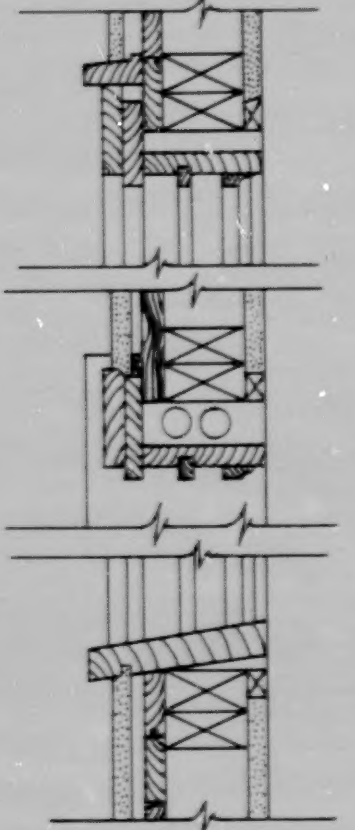


FIGURE 3

A wall in a frame building that is faced with stucco is thicker than one covered with clapboards or siding. This difference in thickness can be taken up by adding a molding to the outside casing as shown in (a), Figure 2. This will require a wider drip mold (b). The difference in the thickness can also be taken up by widening the stiles, head jambs and sills. Figure 2 shows the use of a 5" stud. In Figure 3, 4" studs are used and the blind stop is placed outside the sheathing. The blind stop is also larger as it is extended so as to lap over the sheathing. The actual thickness of the stucco (c), Figure 2, the furring (d), and the stud wall must be carefully obtained before laying out the frame.

In either of the foregoing cases, the process of laying out, cutting and assembling the parts will be much the same as for the check-rail frame.

2. Window Frames for Frame Buildings with Veneered Walls:

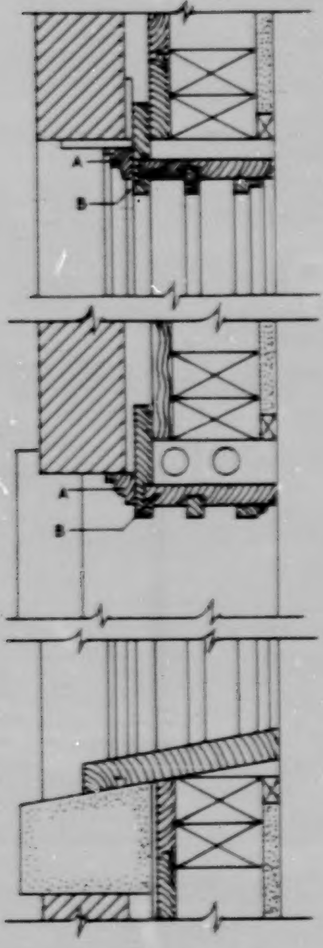


FIG. 4

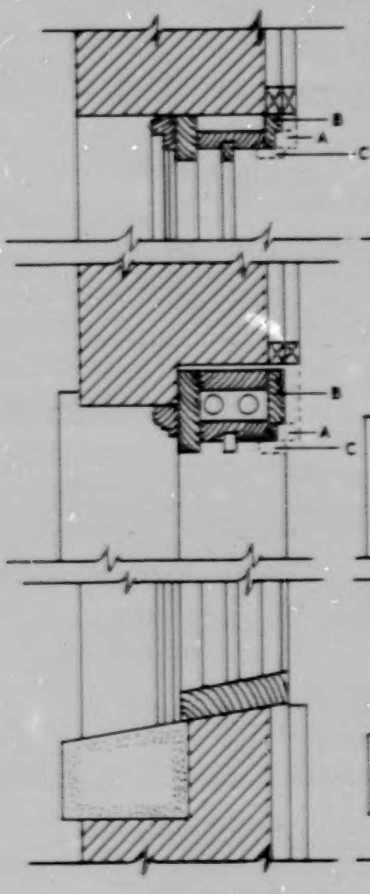


FIG. 5

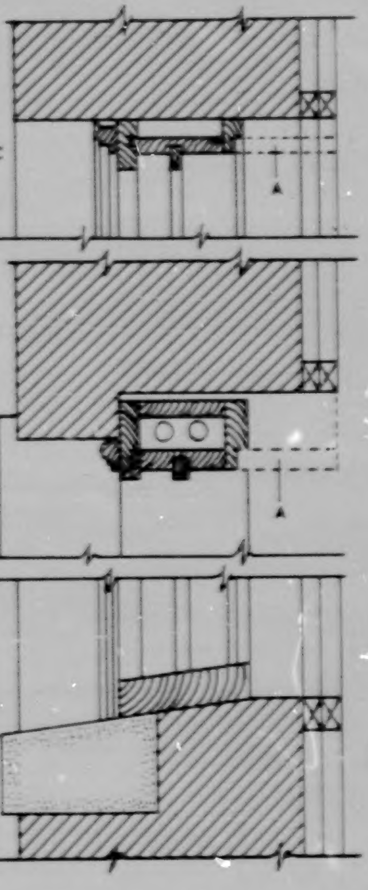


FIG. 6

When a frame building is veneered with brick or stone, the frame is made practically as shown in Figure 4. The widths of the stiles, head jamb, and sill are determined by the thickness of the wooden frame as shown in the illustration. The frame may be made exactly as for the stuccoed wall shown in Figure 2. A staff bead (a), Figure 4, must be provided. It will be an easy matter to make a working bill of this frame after having studied the bill for the check-rail frame on page 2.

In Figures 2 and 3 butt joints have been shown between the pulley stiles and the blind stops. The cheaper stock frames are put together with such joints. In Figure 4 the pulley stile is shown with a tongue, which is let into the blind stop. This is a better joint and makes a stronger and more weather-tight frame. The pulley stiles in this case are made 3/8" wider to provide for the tongue.

3. Window Frames for Brick, Concrete, or Stone Walls:

Box Window Frame: The lumber for a box window frame is handled and manufactured in the same manner as for the frames already described. The cutting and working bills are also made in the same manner. There are more pieces to each frame, as there is a box formed on each jamb to receive the weights.

The frame is generally set back the width of one brick, or about 4" from the outer face of the wall, as shown in Figures 5 and 6. The depth of the frame is 4" + (2 x 13/16) = 5 5/8". When the wall is 8" or 8 1/2" thick the frame will extend inside the brick wall. When the furring and plaster are applied, the face of the plaster will extend behond the frame as shown in Figure 5. In finishing the window a piece (a) called an extension jamb is set into the rabbet of the inside box casing (b) and the joint will be covered by the stop (c), which is part of the interior finish.

In the thicker wall as illustrated in Figure 6 the frame is exactly the same as in Figure 5, but the extension jamb (a), Figure 6 is made wider. If the extension jamb(a) needs to be made more than 5" or 6" in width it is generally paneled.

4. Outside Window Frames for Sash and Casement Windows:

Frames for single sash or casement windows are similar to frames for doors. The size of the rabbets is made to take the sash and the sash are hung generally on the side jambs of the frame.

5. General Notes:

There are numerous styles of sash pulleys, the majority of which can be inserted by hand with the use of an ordinary hammer. Others are held in place by screws, and some styles require a special machine for their application.

Frames for plain-rail windows are different from frames having check-rails, as the parting strips of the former are omitted and a different arrangement of stops is employed. This frame is illustrated in Figure 1. At (a) is the lower sash and at (b) the upper sash. The meeting rails are shown at (c). The upper sash is held up in position by means of a strip (d) that is nailed to the side jambs (e). The lower sash may be raised or lowered. It will naturally fall into the position shown unless held up by a nail or by patent bolts as at (f). This bolt will extend through the stile of the lower sash and will catch in holes or sockets in the upper sash.

All the dimensions of the various parts are determined similarly to those of the check-rail window frame. Also, the parts are cut and put together in practically the same manner as in the check-rail window frame.

The frames to be described under the following points under "Construction" are designed so that the siding will be fitted against the outside casings, over the top of the drip mold, and up into the groove in the sill.

Construction:

1. Process of Laying Out:

The process of laying out, cutting and dressing the lumber, of working the various parts into shape and assembling a window frame will be considered in this lesson. The frame will be for a double-hung window 2'10" x 4'6" x 1 3/8" with a check-rail. The window frame is to be used in a frame building and is to be made of standard construction and of grade "B" yellow or white pine.

a. Sizes of Pieces Required:

The sizes of pieces are obtained from the drawing shown in Figure 7. In order to lay out this drawing the construction of the building, particularly the thickness of the studding, sheathing, and plastering must be known. It has been assumed that these thicknesses are as shown in Figure 7 in the section through the head and also in the plan. The distance between the face of the outside sheathing and the face of the plaster in this case is 5 1/4".

The head jamb is the same in detail as the pulley stile but is not fitted with pulleys.

The sill may be a double sill as shown at (a) and (b) in the vertical section or may be formed of a single piece of board as shown in the alternate sill.

The studding for a frame building may be nominally 2" x 4" or 2" x 6". These sizes when dressed become in width 3 5/8" and 5 5/8" as a minimum and may be 3 3/4" and 5 3/4" in width. It is therefore important to ascertain the exact size of the studding before laying out the window frame.

The lengths of the various pieces on the frame are determined as follows:

(1) Two-piece sill: When a two-piece sill is used, the length of the sill (a) must be equal to the width of the opening plus twice the width of the outside casing = 2' 10" = (2x4 1/2) = 3' 7". The length of the subsill will be equal to the width of the opening plus two dadoes where the ends of the subsill are let into the pulley stiles. The depth of these dadoes is 3/8". The total length of the subsill will therefore be 2' 10" + (2 x 3/8) = 2' 10 3/4".

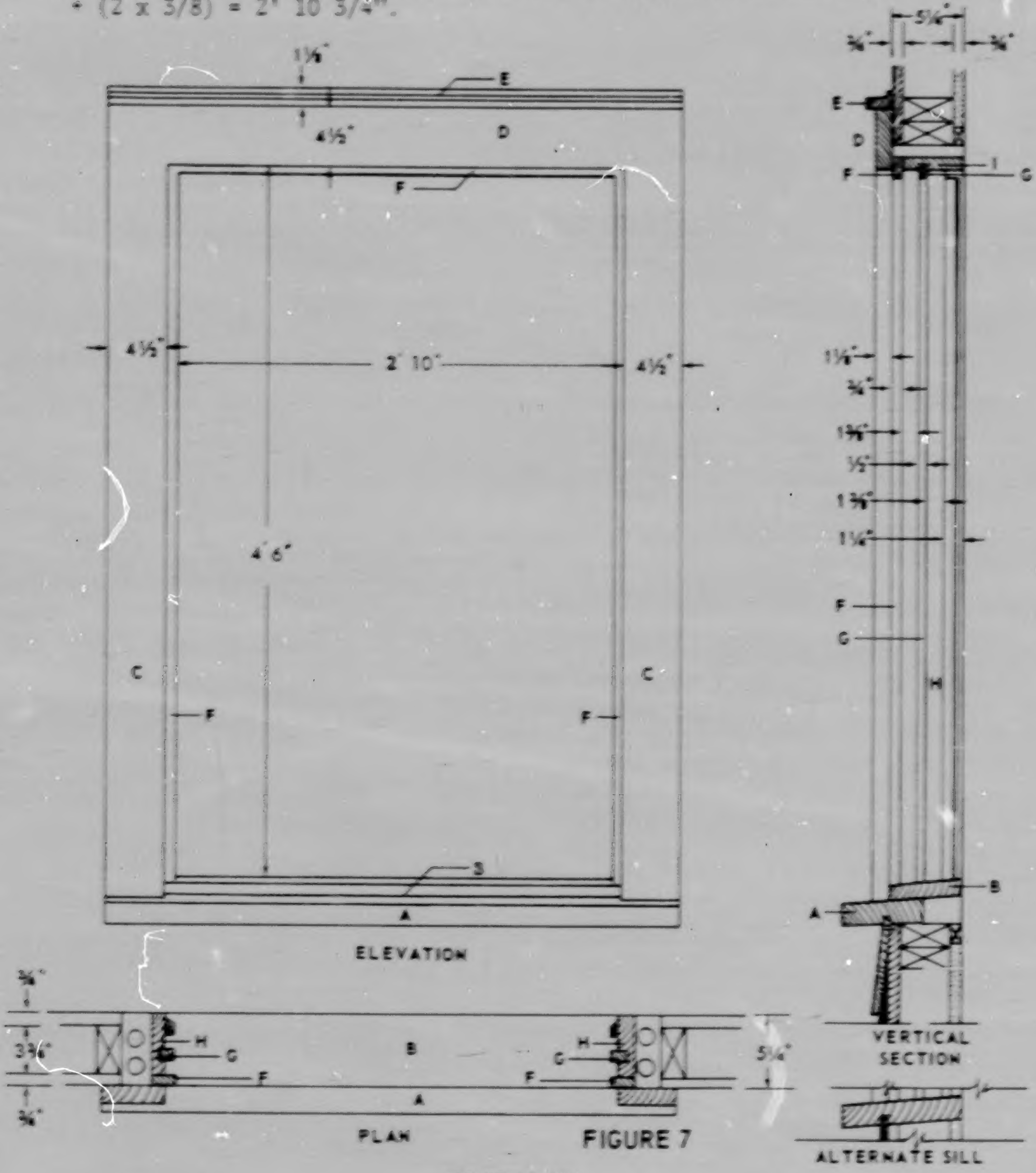

1⅛"
E
4½"
D
F
4½"
2' 10"
4½"
4'6"
C
C
F
F
S
A
ELEVATION
¾"
3⅝"
¾"
H
G
F
B
H
G
F
A
5¼"
PLAN
5¼"
¾"
¾"
E
D
F
I
G
1⅛"
¾"
1⅜"
½"
1⅜"
1⅛"
F
G
H
B
A
VERTICAL SECTION
ALTERNATE SILL

FIGURE 7

(2) One-piece sill: Where a one-piece sill is used as in the alternate sill, Figure 7, its length will be equal to the width of the outside casing, or 2' 10" + (2 x 4 1/2) = 3' 7". The sill must be relished beneath the outside casings as shown in Figure 8.

(3) The length of the outside side casings (c), Figure 7, will be equal to the height of the opening plus the distance from the bottom of the opening to the top of the sill. The distance is assumed as 1 1/2". The total length of the outside casings will therefore be 4' 6" + 1 1/2" = 4' 7 1/2".

(4) The length of the outside head casing (d) will be equal to the width of the window plus twice the width of the casing or 2' 10" + (2 x 4 1/2") = 3' 7".

(5) The length of the drip cap (e) is the same as that of the head casing.

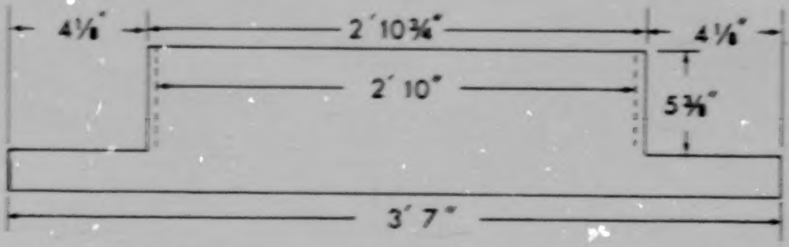


FIGURE 8

(6) The length of the vertical blind stop (f) is equal to the height of the opening, 4' 6". The length of the blind stop across the head is equal to the width of the opening plus 2", or 3'.

(7) The length of the parting strips (g) is equal to the height of the opening or 4' 6" for the sides. For the parting strip across the head, the length will equal the width of the opening plus twice the depth of the groove in which the parting strip rests, or 2' 10" + (2 x 3/8") = 2' 10 3/4".

(8) The length of the pulley stiles (h) is equal to the height of the opening plus 2" at the top and 4" at the bottom, or 4' 6" + 2" + 4" = 5' 0". The head jamb (i) is equal in length to the width of the opening plus twice the depth of the dado in the pulley stiles or 2' 10" + (2 x 3/8") = 2' 10 3/4".

2. Working Bill:

From the foregoing, an allowance being made for about 1/2" additional material in the length, the following working bill is made out:

2 Pulley stiles	13/16" x 4 1/2" x 5' 0"
1 Head jamb	13/16" x 4 1/2" x 2' 11 1/4"
1 Subsill	13/16" x 5 3/8" x 2' 11 1/4"
1 Sill	1 5/8" x 3 1/2" x 3' 7 1/2"
2 Outside side casings	1 1/8" x 4 1/2" x 4' 8"
1 Outside head casing	1 1/8" x 4 1/2" x 3' 7 1/2"
1 Drip cap	1 1/8" x 1 5/8" x 3' 7 1/2"
2 Blind stops	3/4" x 1 3/8" x 4' 9"
1 Blind stop	3/4" x 1 3/8" x 3' 0"
2 Parting strips	1/2" x 3/4" x 4' 7"
1 Parting strip	1/2" x 3/4" x 3" 0"

3. Cutting Bill:

From the sizes given in the working bill is made out a cutting bill, allowances being made for dressing, ripping, and cutting. The following sizes should appear on the cutting bill:

2 Pulley stiles	1" x 5" x 5' 0"
1 Head jamb	1" x 5" x 3' 0"
1 Subsill	1" x 6" x 3' 0"
1 Sill	2" x 4" x 3' 8"
2 Outside casings	1 1/4" x 5" x 4' 8"
1 Outside casing	1 1/4" x 5" x 3' 8"
1 Drip cap	1 1/4" x 2" x 3' 8"
2 Blind stops	1" x 1 1/2" x 5' 0"
1 Blind stop	1" x 1 1/2" x 3' 1"
2 Parting strips	3/4" x 1" x 4' 8"
1 Parting strip	3/4" x 1" x 3' 0"

4. Machine Work:

The rough lumber is taken into the factory or mill and ripped to the required widths on the rip saw. All the parts that are to be planed or square-dressed are then assembled and carried to the four-side molder and dressed according to the working bill and detail.

The pieces for the pulley stiles, head jamb, drip mold, sill and subsill are also carried to the four-side molder and dressed into the shapes and sizes indicated on the working bill and detail. The grooves on the pulley stiles for the parting strips and on the sill are also made at this time. The lumber and moldings for frames as dressed or made on the molder do not usually require any further finishing or sanding.

The pieces are next carried to the frame department and are cut to the required lengths on the cut-off saw.

The pulley stiles are taken to the dado machine and are first dadoed at the top and bottom as shown at (a), (b) and (s) in Figure 9. The dadoes are 3/8" deep. The dado at (a) is made 13/16" wide to take the ends of the head jamb. The dado (b) is made to take the subsill, which is 13/16" thick. The dado (s) is made 1 5/8" as shown. If a single sill is used it will be 1 3/4" thick.

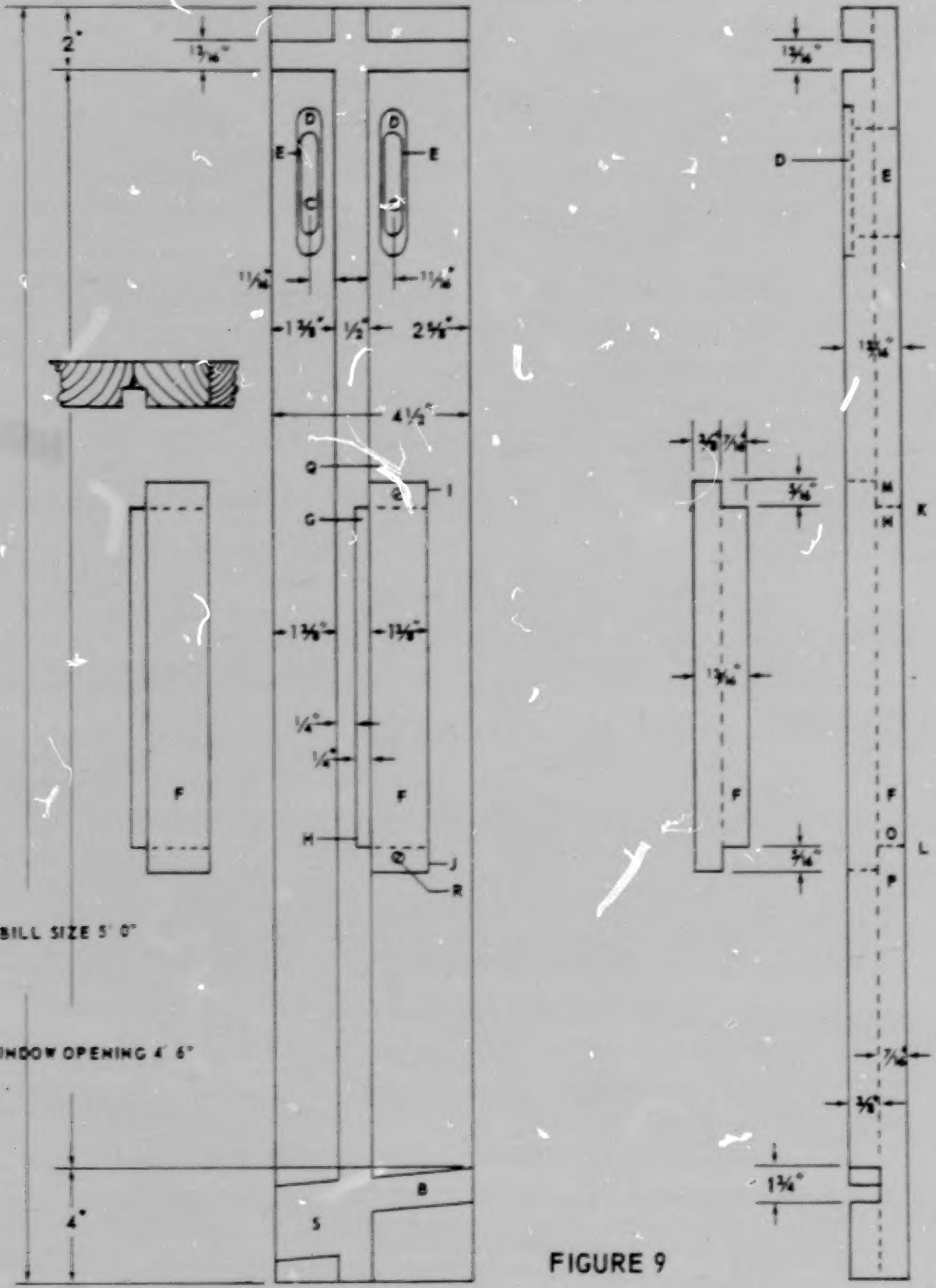

2"
13/16"
D
E
C
11/16"
1 3/8"
1/2"
2 5/8"
4 1/2"
Q
I
G
1 3/8"
1/4"
F
H
J
R
CUTTING BILL SIZE 5' 0"
WINDOW OPENING 4' 6"
4"
B
S
13/16"
D
E
13/16"
3/8"
7/16"
3/16"
M
K
N
13/16"
F
O
L
P
7/16"
3/8"
1 3/4"

FIGURE 9

The pulley stiles are next taken to the pulley mortising machine where the openings (c) for the pulleys are cut. The oval (d) is made only deep enough to receive the face plate of the pulley which is about 1/8" thick. The inner oval (e) which is to receive the body of the pulley, is cut entirely through the stile.

The pockets (f) are cut next by the pocket machine. This machine makes two rip-saw cuts (gh) and (ij). Four cross-cut saws that are attached to the machine make two cuts (i) and (j) on the face and two cuts (k) and (l) on the back of the stile. The pocket (f) is attached to the stile only by the surfaces (mn) and (op). A slight blow of the hammer breaks this contact and loosens the pocket cover. The pocket cover is then free. It is placed back and screws are inserted at (q) and (r) to hold it in place until it is necessary to remove the cover to attach the sash weights.

If the sill is of one piece, it is taken to the Universal saw or special dado machine and the ends are relished as shown in Figure 8.

5. Assembling:

The parts having been carefully made; the next step is to assemble them into frames. The following steps are usually taken in this process:

(a) The sill and subsill are nailed together as shown in Figure 7 at (a) and (b) in the section through the sill.

(b) The parting strips are fitted and nailed into the pulley stiles and the head jamb.

(c) The pulley stiles are nailed to the subsill and the head jamb.

(d) The blind stops are nailed to the edges of the pulley stiles and the head jamb.

(e) The outside casings are nailed to the blind stops and the outside head casing is fitted and nailed to the head.

(f) The drip cap is nailed on top of the head casing.

(g) If the pulleys are to be inserted in the factory, they are put in the pulley stiles before the parting strips are fitted and nailed into the pulley stiles and the head jamb.

CABINETMAKING AND MILLWORK

UNIT H - TOPIC 5

LESSON OBJECTIVE:

STUDY ASSIGNMENT:

REFERENCES:

IMPORTANT STUDY FACTORS:

1. Study thoroughly the different types of sash and their prospective uses.
2. Learn the size of parts of the sash given on page 7.
3. Be able to recognize the various types of woods used in sash construction, i. e., white pine, yellow pine, fir, etc.
4. Know the joints involved in the construction of sash--mortise and tennon with coped joints at the corners.
5. Learn the various steps involved in laying out sash rails.
6. Learn the machine work involved in making sash.
7. Know what a sash clamp is and how it is used.
8. Know how plain-rail windows are constructed and how they differ from standard-rail construction.
9. Study the method of glazing.

WORK ASSIGNMENT:

1. In laying out sash the first step is to ascertain the __________________ dimensions.
2. According to the western schedule or layout, the allowance for the face size of the wood in the width is __________ inches.
3. The allowance in the height is __________ inches.

UNIT H - TOPIC 5

WORK ASSIGNMENT (cont'd)

4. A standard check-rail window is made up of two ______________, the upper and lower.

5. The most common woods used in the manufacture of sash are ______________ ______________ and ______________.

6. The stiles and rails of the window are joined with ______________ and ______________ joints, both faces and the outer edges planed, and the inner edges ______________ or ______________.

7. ______________ joints are used at the corners.

8. Stiles are ______________ and ______________ to receive the sash cord.

9. All bars are ______________ at both ends to fit against the moldings on the rails.

10. The tenons on the ends of the bars in the upper sash where they join the meeting rails are not ______________, but have square shoulders where they join the meeting rail.

11. The term ______________ means shallow hole or mortise.

12. The thickness of sash rails is ______________ inches.

13. The various measurements are all laid out from one ______________, generally the ______________ face of the sash or window.

14. Bottom rails are relished on a ______________ machine.

15. In assembling the sash the ______________ are loosely fitted to the bottom rail; the ______________ are next fitted into the ______________ rail; the meeting rail fitted over the ends of the ______________ and ______________; and last the ______________ are slipped into their place between the bars and the stiles.

16. The sash is placed in a sash ______________ where it is forced into a square position.

17. ______________ or ______________ nails are driven into each corner to hold the parts firmly together.

18. According to the western layout plain-rail windows are ______________ instead of 2' 10 1/2".

19. Outside windows and sash are always made so that the glass will be held in place by means of ______________ tacks and ______________.

UNIT H - TOPIC 5

WORK ASSIGNMENT (cont'd.)

20. Inside sash and windows are usually made so that the glass will be held in the frame by means of ________________________ stops.

INTRODUCTION TO NEXT LESSON:

UNIT H - TOPIC 5

Types and Construction of Screens and Storm Sash

LESSON OBJECTIVE:

To provide the apprentice with the knowledge of billing, layout, and making of screens and storm sash.

STUDY ASSIGNMENT:

Architectural Woodwork Design, pp. 41-44, 164-166.

REFERENCES:

Architectural Woodwork Design Book #505, Curtis Co., Inc.

IMPORTANT STUDY FACTORS:

1. Learn the correct size of screen for 2-light, double-hung window.
2. Learn the correct size of screen and storm doors for the various sizes of entrance doors.
3. Learn the various types of screens, window and door, and storm sash and storm doors.

WORK ASSIGNMENT:

1. The combination storm and screen doors are made ____________ opening size in width and ______________ over in height.
2. Bars in storm sash should line up with ________________ in window.
3. To make storm sash you should have the _______________ size of double-hung window.
4. Storm sash should have ______________________ in bottom rail.
5. Screen windows should be the same ______________________ as the storm sash.
6. For standard double-hung window 24" x 24"/24" glass, the size of the screen should be ____________________.

UNIT H - TOPIC 5

WORK ASSIGNMENT (cont'd.)

7. Make a detail drawing of window frame; also cross section showing window and storm sash or screen.
8. Make a detail drawing of door frame; also cross section showing door and storm or screen door.

INTRODUCTION TO NEXT LESSON:

UNIT H - TOPIC 5

Double-Hung Window Frames - Drawing, Detailing and Billing

LESSON OBJECTIVE:

To teach the apprentice how to detail and bill a double-hung window frame.

STUDY ASSIGNMENT:

Architectural Drawing for the Building Trades, pp. 58, 59, and 60

REFERENCES:

Architectural Drawing for the Building Trades, Kenney and McGrail

IMPORTANT STUDY FACTORS:

1. Learn why windows are important to a house.
2. Study the steps necessary in drawing a head section.
3. Learn the steps necessary to draw a sill section.
4. Learn how to draw an elevation of a window.
5. The instructor will instruct the class on the proper method of billing.

WORK ASSIGNMENT:

The apprentice will be required to detail and bill a double-hung frame as in Figure 55 for a stock 24" x 24" double-hung window.

1. The net opening width of a frame for 24" x 24" glass is ______________.
2. The net opening height of a frame for 24" x 24" glass is ______________.
3. A window stile is ________________wide, over the glass.
4. The bottom rail of a window is ______________wide, over the glass.
5. Stock parting bead is ________________x________________.

UNIT H - TOPIC 5

WORK ASSIGNMENT: (cont'd.)

6. Stock blind stop is ____________________ thick.

7. A stock jamb exclusive of casings is __________________ wide.

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT H - TOPIC 6

Doors and Door Frames

LESSON OBJECTIVE:

To acquaint the apprentice with the various types of doors and the frames for them.

STUDY ASSIGNMENT:

United Brotherhood of Carpenters, Unit VIII, pp. 21-34

IMPORTANT STUDY FACTORS:

Have each apprentice fill out a list of the doors where he lives; material, size, construction, grade, condition.

WORK ASSIGNMENT:

Study U.B.C. Unit VIII, pp. 21-34. Answer all questions on scratch paper for class grading. Also, list questions regarding doors and construction as you think of them.

INTRODUCTION TO NEXT LESSON:

Cabinetmaking and Millwork, Dahl & Wilson
Chapter XIV, pp. 247-270; pp. 302-303

UNIT H - TOPIC 6

Doors and Door Frames Construction

LESSON OBJECTIVE:

To teach the apprentice different methods of door and door frame construction

STUDY ASSIGNMENT:

Cabinetmaking and Millwork, Dahl & Wilson, Chapter XIV, pp. 247-269; pp. 302-303

REFERENCES:

California Workbook, Part 2, pp. 67-73
California Workbook, Part 3, pp. 93-101

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Study Cabinetmaking and Millwork, Dahl & Wilson, Chapter XIV, pp. 247-269; pp. 302-303.

Answer questions on scratch paper. Exchange papers for grading and discussion.

INTRODUCTION TO NEXT LESSON:

Fitting and Hanging Doors.
California Workbook, Part 2, pp. 67-73
California Workbook, Part 3, pp. 93-101

CABINETMAKING AND MILLWORK

UNIT H - TOPIC 6

Fitting and Hanging Doors

LESSON OBJECTIVE:

To acquaint the apprentice with the tools and procedures for door fitting and hanging.

STUDY ASSIGNMENT:

California Workbook, Part 2, pp. 67-73
California Workbook, Part 3, pp. 93-101

REFERENCES:

Cabinetmaking and Millwork, Dahl & Wilson, pp. 247-270
United Brotherhood of Carpenters, Unit VIII, pp. 21-34

WORK ASSIGNMENT:

California Testbook, Part 3, pp. 47-48
California Workbook, Part 3, pp. 93-101
California Workbook, Part 2, pp. 67-73

Answer all questions on scratch paper. Exchange in class for grading and discussion. List questions of your own.

INTRODUCTION TO NEXT LESSON:

Assignment and information sheets 08.06._______ to 08.06.______

CABINETMAKING AND MILLWORK

UNIT H - TOPIC 6

Door Construction

LESSON OBJECTIVE:

To renew and extend the apprentice's knowledge of doors and construction; to test what he has retained.

STUDY ASSIGNMENT:

Assignment sheets 08.06.________ to 08.06.__________

REFERENCES:

Cabinetmaking and Millwork, Dahl & Wilson
United Brotherhood of Carpenters, Unit VIII

IMPORTANT STUDY FACTORS:

Look up door types in the Commercial Standards Pamphlets, CS 120-58, Ponderosa Pine Doors; and CS 171-58, Hardwood Veneered Doors

WORK ASSIGNMENT:

Study and answer all questions on sheets 08.06.__________ to 08.06.___________.

INTRODUCTION TO NEXT LESSON:

Door and Sash Hardware

CABINETMAKING AND MILLWORK

UNIT H - TOPIC 6

Door Frames (Kinds and Construction)

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of the different types of door frames and their construction.

STUDY ASSIGNMENT:

Read the complete Information Sheet for Lesson 66
Millwork, Part Two, pp. 48-58

IMPORTANT STUDY FACTORS:

1. Learn the parts of an outside door frame.
2. Know the parts of an outside door jamb.
3. Find the width of an outside door frame jamb in a wall covered with siding.
4. Learn the thickness of a jamb with an applied stop.
5. Find the length of a sill in an outside frame housing a 3-foot door.
6. Know the width of a frame in a brick veneered wall.
7. Know what additional thickness to add to a door frame in a stuccoed wall.
8. Find the width of an inside door jamb in an ordinary wall.
9. Know why the side jambs are dadoed in the top.
10. Find the depth of the dado in the side jambs.
11. Know the type of jamb used in thick partitions.
12. Know the two kinds of hinges used in the two types of double acting door jambs.
13. Learn how to construct a sliding door frame.
14. Learn the advantage of making a sliding door jamb in two pieces.

(Supplemental)

UNIT H - TOPIC 6

Door Frames (Kinds and Construction) (cont'd.)

WORK ASSIGNMENT:

1. An outside door frame consists of two ____________________, one ____________________, one ____________________, two ____________________ casings, one ____________________, and one ____________________.
2. An inside door jamb consists of two ____________________ and one ____________________.
3. The width of the outside door frame jamb in a wall covered with siding is ____________________ inches.
4. The thickness of a jamb with an applied stop is ____________ inches.
5. The length of a sill in an outside frame housing a three-foot door is ____________________.
6. The width of a door frame in a brick veneered wall is ____________.
7. The additional thickness allowed in a stucco covered wall frame is from ____________ inches to ____________ inches.
8. The width of an inside door jamb in an ordinary wall is ____________.
9. The side jambs are dadoed in the top to receive the ____________________ ____________________.
10. The depth of the dado in a side jamb is ____________.
11. The jamb used in a thick partition is a ____________________ jamb.
12. The two types of hinges used in double acting doors are ____________________ and ____________________ hinges.
13. A sliding door frame consists of ____________________ frames.
14. The advantage of making a sliding door jamb in two pieces is to allow for a certain amount of ____________________.

INTRODUCTION TO NEXT LESSON:

(Supplemental)

UNIT H - TOPIC 6

Door Frames (Kinds and Construction)

INFORMATION SHEET

Outside Door Frames:

1. Outside Door Frame in Wall Covered with Siding:

In Figure 1 are shown details of an outside door frame in a wall covered with siding. In "A" is an elevation of the outside, in "B" sections of a rabbeted frame, and in "C" sections of a frame with an applied stop. This frame consists of two side jambs (a) in "B" and "C", one head jamb (b), one sill (c), two side casings (d), one head casing (e), one drip mold (f). The frame shown in "B" has a rabbet worked in the jamb as at (g). A rabbet may be formed by applying a stop (h) to the face of the jambs and head as shown in "C".

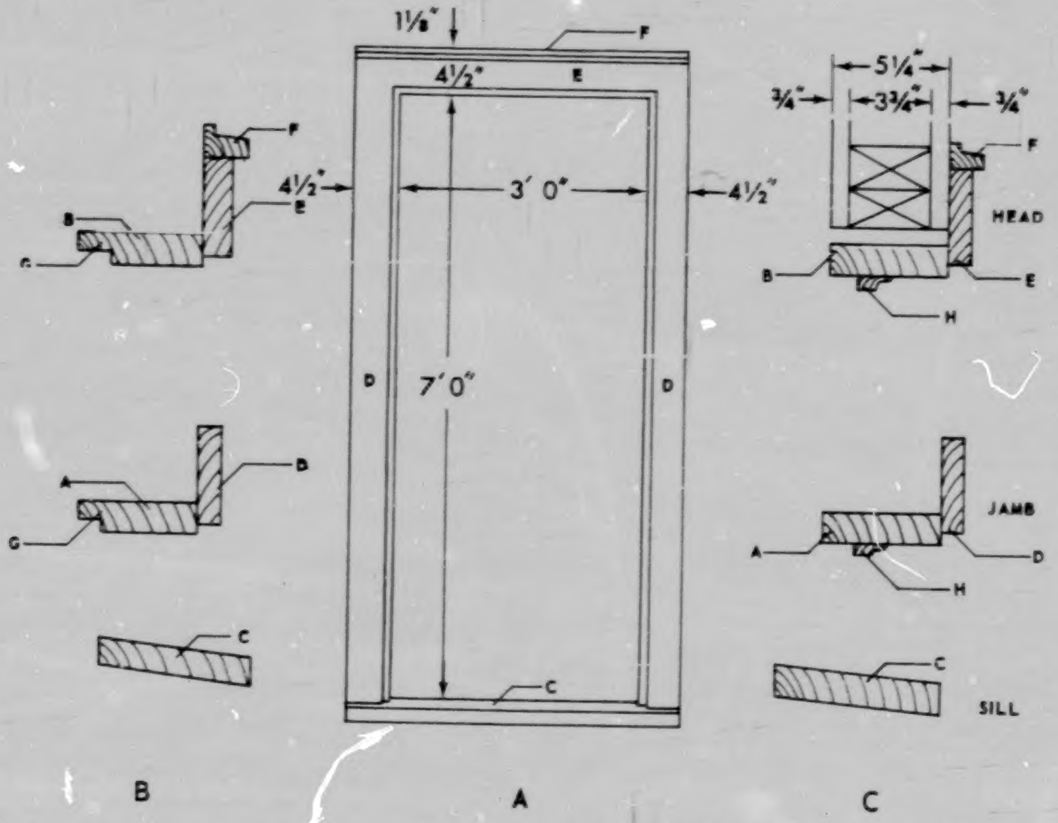


FIGURE 1

(Supplemental)

UNIT H - TOPIC 6

Door Frames (Kinds and Construction)

INFORMATION SHEET (cont'd.)

a. Sizes of pieces required for a rabbeted frame for an outside door 3' 0" x 7' 0" x 1 3/8":

(1) Length of side jambs are equal to height of door plus dados for head and sill and plus extensions beyond dados, or 7' 0" + 13/16" + 1 5/8" + 1" + 2 9/16" = 7' 6" as shown in "A", Figure 2.

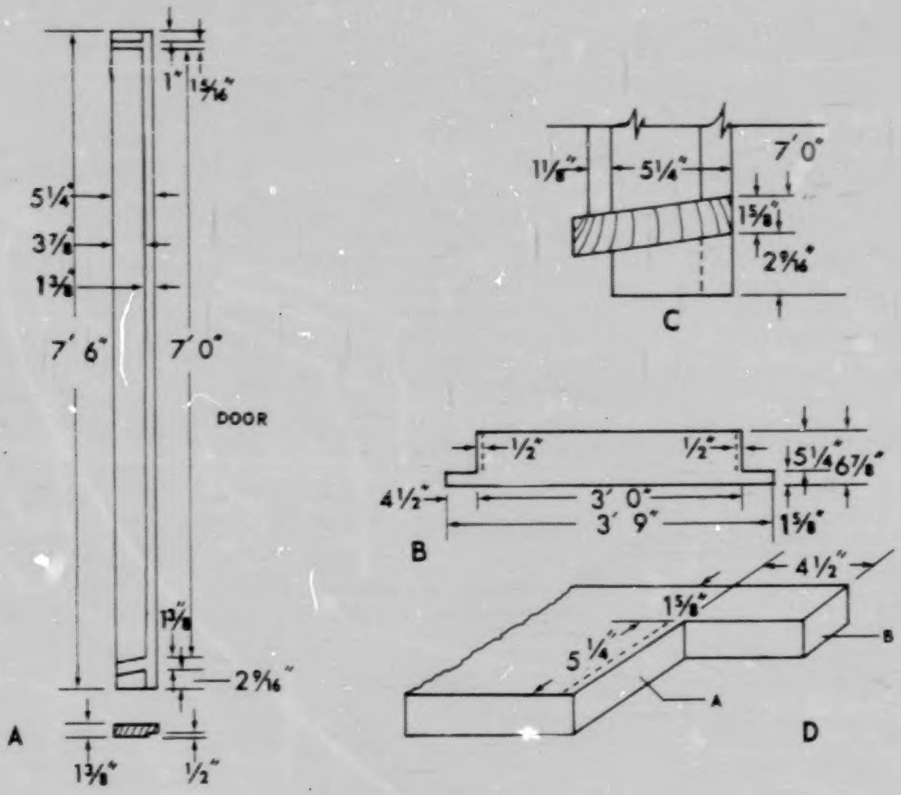

1"
1 5/16"
5 1/4"
3 7/8"
1 3/8"
7' 6"
7' 0"
DOOR
1 5/8"
2 9/16"
A
1 3/8"
1/2"
1 1/8"
5 1/4"
7' 0"
1 5/8"
2 9/16"
C
1/2"
1/2"
5 1/4"
6 7/8"
4 1/2"
3' 0"
3' 9"
1 5/8"
B
4 1/2"
1 5/8"
5 1/4
B
A
D

FIGURE 2

(2) Width of side jamb is equal to thickness of studs in the wall plus thickness of outside sheathing and inside lathing and plastering as shown in "C", Figure 2. Total, 5 1/4".

(3) Rabbet for door is 1 3/8" wide and 1/2" in depth when jambs are made 1 3/8" in thickness. If jambs are made of 13/16" material, they are not rabbeted, but a stop is used as in (h),

(Supplemental)

UNIT H - TOPIC 6

Door Frames (Kinds and Construction)

INFORMATION SHEET (cont'd.)

Figure 1, "C". However, this construction is not as strong or satisfactory as that with the thicker jambs.

(4) Length of head jamb will be the width of the door plus twice the depth of the dado in the jamb into which the head jamb enters, or 3' 0" + (2 x 1/2") = 3' 1". Width is the same as for the side jambs 5 1/4".

(5) Length of the sill will be equal to the width of the door plus twice the width of the outside casing, or 3' 0" + 4 1/2" = 3' 9". Width of the sill is 5 1/4" plus the thickness of the outside casing plus about 1/2" which projects beyond the face of the outside casing, or about 7" as in Figure 2, "C".

(6) The sill will be relished at each end as shown in Figure 2, "B". A view of the cut on the end of the sill is shown in "D". The portion (a), which is 5 1/4" long enters the side jamb and the portion (b) extends under the outside casing on each side of the door opening. In some cases the jambs are dadoed into the sill.

(7) Length of side casing will be slightly longer than the height of the door, or about 7' 2". Side casings will be cut in between the head casing and the sill. Width of the casings will be 4 1/2" and the thickness will be 1 1/8".

(8) Length of the head casing will be equal to the width of the door plus twice the width of the side casings, or 3' 9".

(9) Length of the drip mold will be the same, 3' 9".

b. Working Bill:

The following is a working bill of the parts of the rabbeted door frame just described:

2 Side Jambs	1 3/8" x 5 1/4" x 7' 6"
1 Head Jamb	1 3/8" x 5 1/4" x 3' 1"
2 Outside Casings	1 1/8" x 4 1/2" x 7' 2"
1 Head Casing	1 1/8" x 4 1/2" x 3' 9"
1 Drip Cap	1 1/8" x 1 5/8" x 3' 9"
1 Sill	1 5/8" x 7 1/2" x 3' 9"

c. Machine Work:

The parts are carefully laid out and handled at the machine according to the requirements of each piece as indicated in the working bill.

(Supplemental)

UNIT H TOPIC 6

Door Frames (Kinds and Construction)

INFORMATION SHEET (cont'd.)

d. Assembling:

When all the parts have been machined they may either be assembled if required for a certain job, or if they are to be kept in stock until sold, the parts are packed together in bundles and are sold as knocked down. They may be shipped knocked down and assembled at the building for which they are bought.

2. Outside Door Frame in Wall Covered with Stucco:

In a door frame in a stuccoed wall the jambs are made wider to accommodate the extra thickness of the wall due to the addition of furring for the stucco. This additional thickness is 3/4" or 7/8". The frame is made as for a wall with siding with this additional width of jamb.

An additional strip (a), Figure 3, is sometimes rabbeted into the jambs and nailed to the sheathing and a bevel is formed in the outside casings (b), so that the stucco may extend behind the casing and thus form a tight joint. Otherwise, this type of frame is laid out, manufactured and assembled in the manner already described.

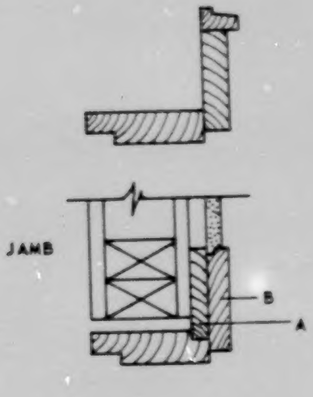


FIGURE 3

3. Outside Door Frame in Brick Veneered Wall:

An outside frame in a brick veneered wall is shown in Figure 4. The frame has side jambs (a), which are made about 6" longer than the height of the door. The width is equal to the thickness of the wooden wall, 5 1/4", plus the thickness of the strip (b), which is 3/4", thus making the width 6". The jambs are rabbeted for the door and also to take a

(Supplemental)

UNIT H - TOPIC 6

Door Frames (Kinds and Construction)

INFORMATION SHEET (cont'd.)

strip (b). The head jamb is 6" in width, has two rabbets, and the length is the width of the opening plus 2 dados (1"). The strips (b) are the same length as the side jambs and are 3" and 4" wide. The corresponding strip across the head will have a length equal to the width of the opening plus twice the width of the side strips (b).

The sill (c) is equal in length to the masonry opening, and is let into the jambs as shown in Figure 2. It is also relished as shown in Figure 4 at (d).

The width of the sill will be 6" + 1 1/8" + 3/8" = 7 1/2" or 8". The sill is made level under the door so that a saddle (e) will rest on it and cover the joint between the sill and the floor. The staff bead (f) is made about 1 1/8" thick if screen doors are to be hung on it and about 1 3/4" wide.

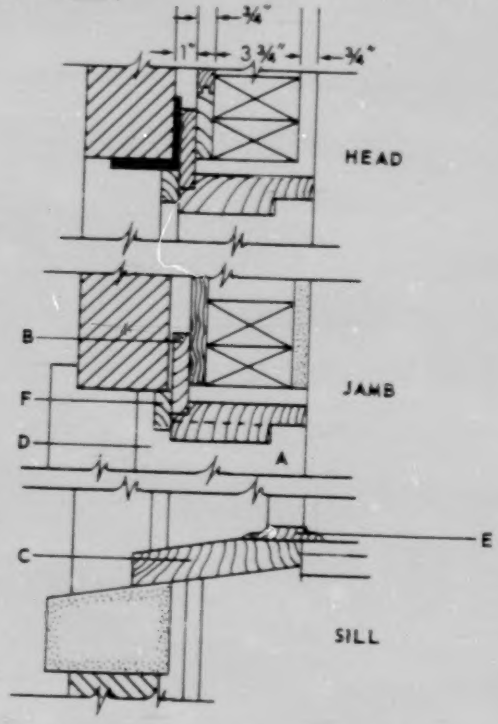


FIGURE 4

Instead of dadoing the pulley stile or side jambs to receive the sill, it is the practice in many localities to dado the sills to receive the jambs. In making the frames, the frame maker will be guided by the working bill or by custom.

(Supplemental)

UNIT H - TOPIC 6

Door Frames (Kinds and Construction)

INFORMATION SHEET (cont.d)

4. Outside Door Frame in Masonry Wall:

An outside door frame in a solid brick, stone, or concrete wall is often referred to as a plank frame, as it is made of planks or thick boards that extend up the sides and across the top of the masonry opening. In Figure 5, "A" is an elevation of the front of the frame; in "B" is a cross-section of the frame; and in "C" are enlarged sections through the head, jamb and sill. No wooden sill is used in the construction of these frames. The side jambs rest on a cement or stone sill. The jambs are therefore made slightly longer than required and are fitted to the sill when the frame is brought to the building. The side jambs are dadoed to receive the head jamb.

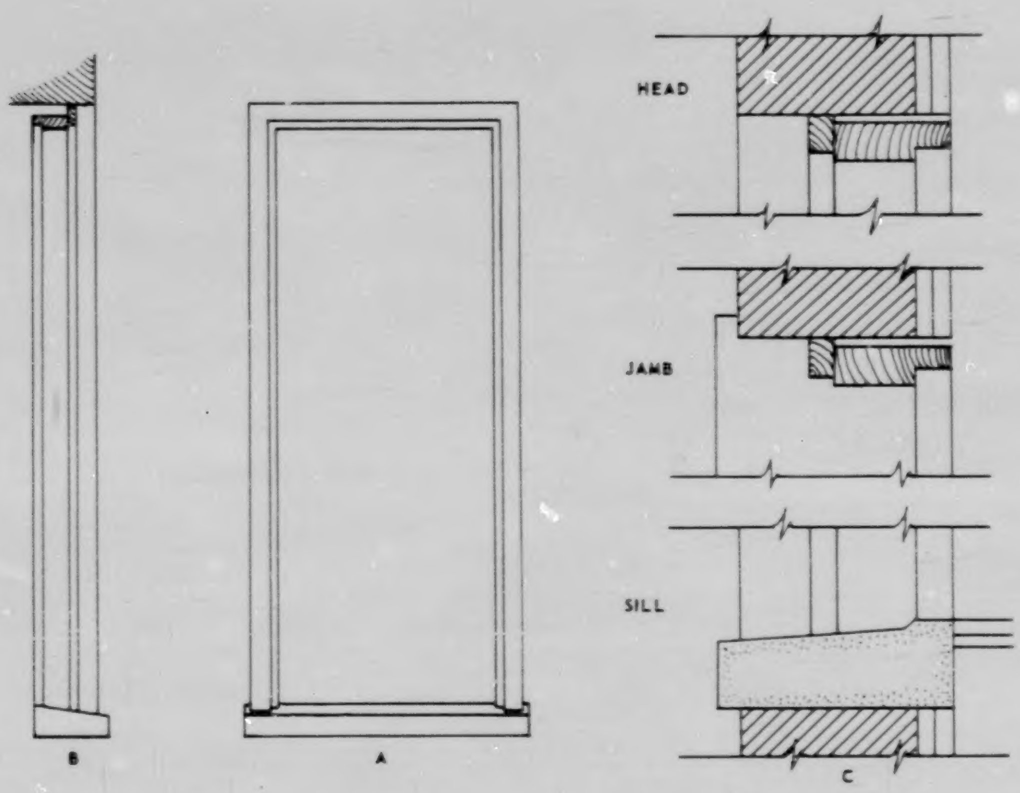


FIGURE 5

UNIT H - TOPIC 6

Door Frames (Kinds and Construction)

INFORMATION SHEET (cont'd)

Inside Door Frames:

1. Inside Door Frame in Wooden Partition:

The ordinary door frame in a stud and plaster partition is equal in width to the width of the studs of which the partition is constructed plus two layers of lath and plaster. If the stud is 3 3/4", and the thickness of the lath and plaster is 3/4", the thickness of the partition will be 5 1/4", which will also be the width of the jamb of the door frame.

When the door frame is rabbeted to receive the door it will be made at least 1 3/8" thick. Jambs, when the stops are applied, are generally made 13/16" thick.

The ordinary door frame consists of three parts; namely, two side jambs and one head jamb as shown in Figure 6, in which the side jambs are at (a) and the head jamb at (b).

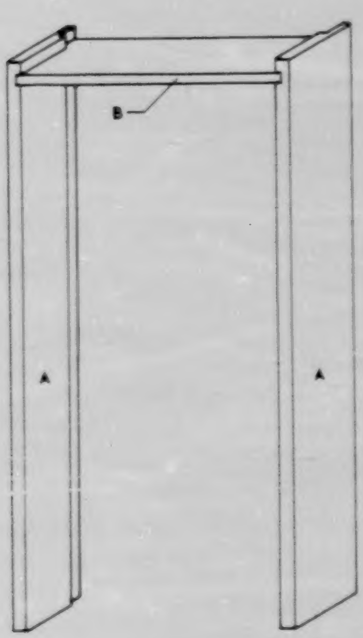


FIGURE 6

A section through a jamb of a frame in which a stop is applied to the jambs is shown in Figure 7, in which the jamb is at (a) and the applied stop at (b).

In both kinds of jambs the side jambs are dadoed at the top to receive the head jamb as shown at (c) in Figure 6. The depth of the dado is about 1/2".

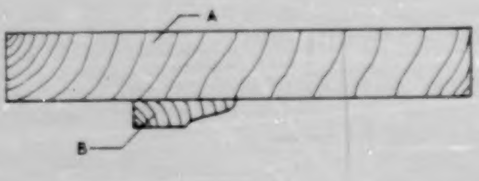


FIGURE 7

Door Frames (Kinds and Construction)

INFORMATION SHEET (cont'd.)

a. Working bill for solid-rabbeted jamb:

A working bill for a solid rabbeted jamb, 1 3/8", for a door 2' 8" x 6' 8" x 1 3/8", is as follows:

2 Side Jambs	1 3/8" x 5 1/4" x 7' 0"
1 Head Jamb	1 3/8" x 5 1/4" x 2' 9"

b. Working bill for jambs with separate stops:

A working bill for a 13/16" thick jamb with applied stops for a door 2' 8" x 6' 8" x 1 3/8" in size, is as follows:

2 Side Jambs	13/16" x 5 1/4" x 7' 0"
1 Head Jamb	13/16" x 5 1/4" x 2' 9"
2 Stops	3/8" x 1 3/8" x 6' 9"
1 Stop	3/8" x 1 3/8" x 2' 9"

The lengths of the side jambs will be the height of the door plus the thickness of the head jamb plus 1" for fitting at the bottom plus 1 5/8" at the top, making a total length of 7'.

With this working bill and a knowledge of the methods of handling the frames already described it should be easy to lay out this frame successfully.

2. Door Frame in Thick Partition:

When an interior partition or wall is unusually thick it is formed by 3 3/4" or 5 3/4" studs; the jambs required are too wide to be made of a single board and are generally paneled. These jambs are called paneled jambs. In Figure 8 is shown a brick wall plastered on both sides. The total thickness must be carefully measured so that the jamb will be wide enough. If the thickness of the wall including the plaster coats is

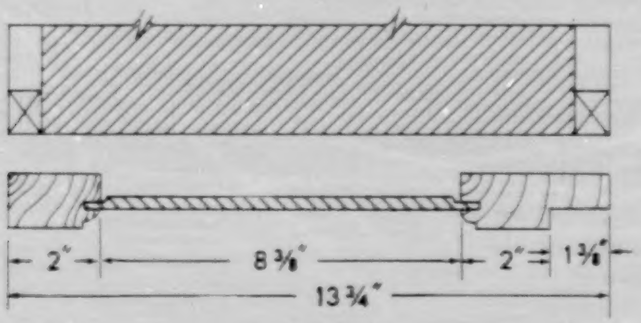


FIGURE 8

(Supplemental)

UNIT H - TOPIC 6

Door Frames (Kinds and Construction)

INFORMATION SHEET (cont'd.)

13 3/4", the paneled side jambs may be laid off as shown with the left-hand stile 2" wide, the right-hand stile 3 3/8" wide and the exposed panel 8 3/8" wide. The 3 3/8" stile must be rabbeted 1 3/8" x 1/2" to receive the door. The head jamb will be of the same design and cross-section as the side jamb. The jambs are laid out in exactly the same manner as a door and the three jambs are put together in the same manner as the side jambs and head jamb of the frame for an ordinary door.

If desired or shown on the detail the jambs may be divided in their height into two or more panels by the introduction of rails. These panels should correspond in height to the panels in the door. All this work is done just as if the panel were a door, the laying out and assembling of which has already been described in detail.

Another form of jamb that may be used when the wall is of more than ordinary thickness is illustrated in Figure 9 and is called a rabbeted jamb with jamb lining. The jamb is shown at (a) and the lining at (b). Adjustments to fit the thickness of the partitions can be made in the width of the lining.

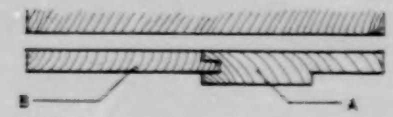


FIGURE 9

Types of Double-Acting Door Jambs:

In Figure 10 are shown jambs such as are used with double-acting doors. These jambs are simple in construction and are easily laid out and manufactured. The frame shown in (a) is used for a door hung with double-acting butts, and that in (b) is used for doors operated by floor hinges.

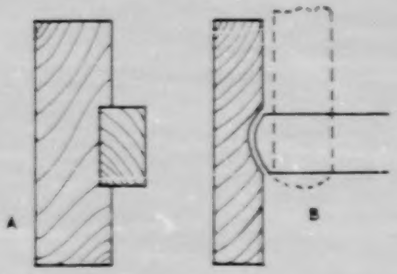


FIGURE 10

Door Frames for Sliding Doors:

A sliding-door frame consists of practically two frames, one on each side of the door. Sometimes the partitions on each side of the door are of the same

Door Frames (Kinds and Construction)

INFORMATION SHEET (cont'd.)

thickness, but more frequently the partition on one side of the door is made of 4" studs, making a partition from 5" to 6" thick, whereas the partition on the other side is made with the studs set flatwise, making a partition from 3" to 4" thick. A frame for such a partition is shown in the diagram in Figure 11, in which "A" is a section through the head, "B" a section through the jamb, "C" a section through the striking jamb, and "D" a view of the head.

The thickness of the partitions have been made as shown in "B", where the left-hand partition is 5" and the right partition is 3". These dimensions will be the widths of the jambs. The jambs may be made of a single piece for each side of the door, but in "B" each jamb is shown made up of two pieces. This is the customary method of making stock jambs. The advantage of making the jambs in two pieces is that there will be a certain amount of adjustment possible. The joint between the two pieces can be opened somewhat, thus making the jamb wider if required. The joint is covered by the stop on each side of the opening to the pocket. These stops are put on the jamb and are adjusted to the thickness of the door.

1. Working Bill:

A working bill for a sliding door frame of the design shown for a pair of doors requiring an opening 6' 0" x 7' 0" in size will be as follows:

2 Side Jambs	13/16" x 4 1/4" x 7' 2"
4 Side Jambs	13/16" x 1 1/2" x 7' 2"
2 Side Jambs	13/16" x 2 1/4" x 7' 2"
4 Stops	1/2" x 2 1/4" x 7' 2"
1 Head Jamb	13/16" x 4 1/4" x 6' 1"
1 Head Jamb	13/16" x 2 1/4" x 6' 1"
2 Head Jambs	13/16" x 2 3/4" x 6' 1"
2 Stops	1/2" x 2 1/4" x 6' 1"

If this frame is made with a closed strike at one end, as in "C", Figure 11, deduct two pieces 13/16" x 1 1/2" x 7' 2", and add one piece 13/16" x 6 1/2" x 7' 2".

(Supplemental)

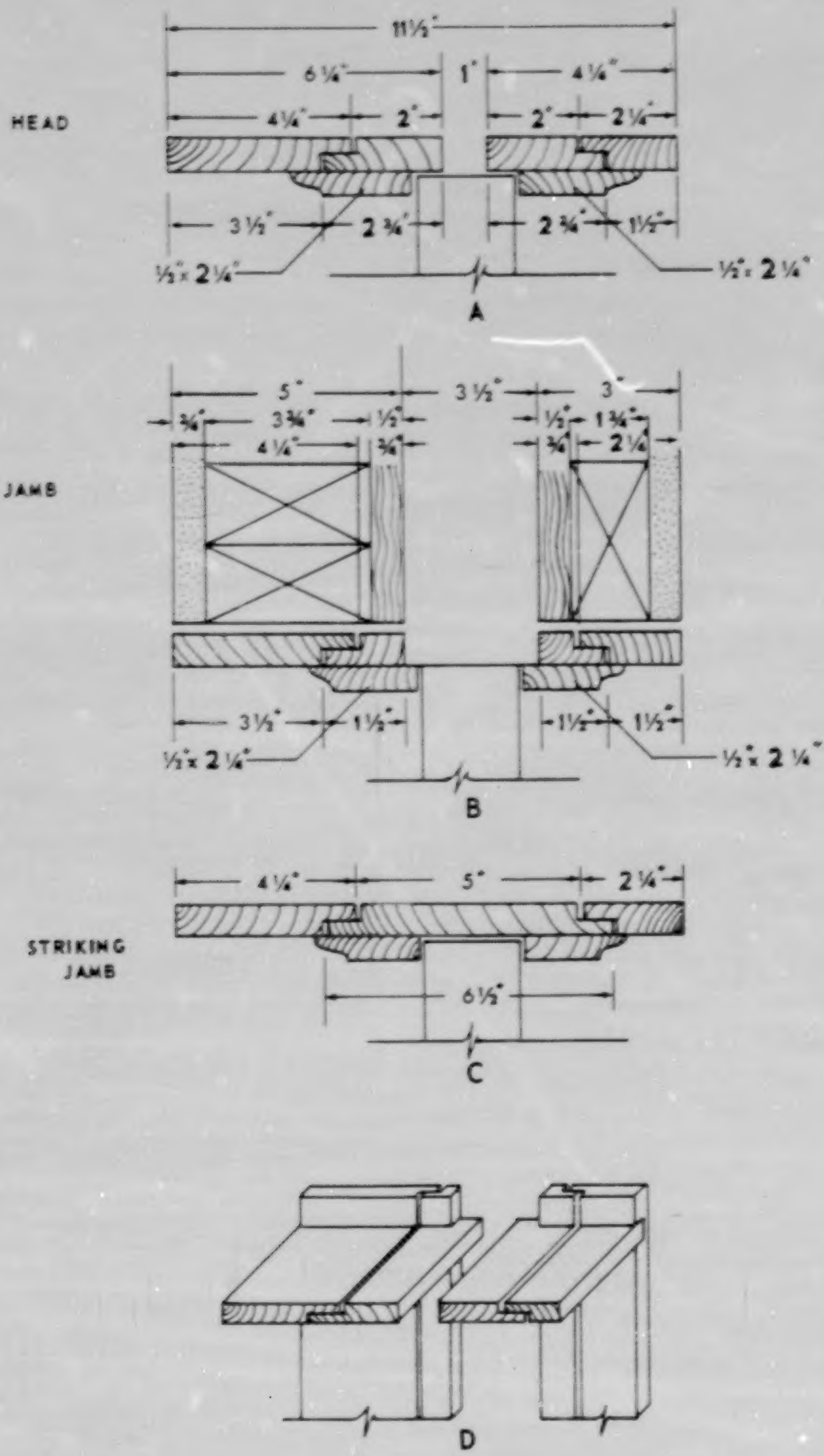

HEAD
11½"
6¼"
1"
4¼"
4¼"
2"
2"
2¼"
3½"
2¾"
2¾"
1½"
½" x 2¼"
½" x 2¼"
A
JAMB
5"
3½"
3"
¾"
3¾"
½"
½"
1¾"
4¼"
¾"
¾"
2¼
3½"
1½"
1½"
1½"
½" x 2¼"
½" x 2¼"
B
STRIKING JAMB
4¼"
5"
2¼"
6½"
C
D

FIGURE 11

CABINETMAKING AND MILLWORK

UNIT H - TOPIC 6

Door Construction (Entrance)

LESSON OBJECTIVE:

To familiarize the apprentice with the standards of construction that apply to entrance doors.

STUDY ASSIGNMENT:

Read pp. 1 to 13

REFERENCES:

Factory-Fitted Douglas Fir Entrance Doors, Commercial Standard CS91-41; U. S. Government Printing Office.

IMPORTANT STUDY FACTORS:

1. Know the purpose and scope of commercial standards.
2. Be able to give five general requirements for standard factory-fitted fir entrance doors.
3. Learn the two sizes in which doors are manufactured.
4. Pay particular attention to the types of sticking and panel details as shown on page 3.

WORK ASSIGNMENT:

1. Describe the material from which entrance doors are made.
2. What is the thickness of stock entrance doors?
3. How should an entrance door be packaged?
4. What are the dowel requirements in entrance doors? Diameter ____________ Length ________________ Number per rail ________________
5. Give the requirements of stiles and rails. What are the allowable defects?

(Supplemental)

UNIT H - TOPIC 6

Door Construction (Entrance)

WORK ASSIGNMENT: (cont'd.)

6. What is the thickness of the veneer on slab doors having V-grooves?

7. Illustrate and indicate the width dimension on the following types of sticking:

   a. OVOLO

   b. PANEL RAISED (1 side)

   c. WIDE

   d. O - G

8. In the chart below supply the information requested:

Design No.	Over-all Dimensions					Height - floor to lock rail
	Stile	Top rail	Bottom rail	Muntin	Lock rail	
2005						
2020						
2045						
2085						
2130						

9. Define:

   a. Check ______________________________

   b. Core ______________________________

   c. Flush door ______________________________

   d. Panel door ______________________________

   e. Sash door ______________________________

(Supplemental)

UNIT H - TOPIC: 6

Door Construction (Entrance)

WORK ASSIGNMENT: (cont'd.)

f. Moisture content ______________________________

g. Shake ______________________________

h. Crossbanding ______________________________

____

10. How are doors marked that conform to the standards?

INTRODUCTION TO NEXT LESSON:

(Supplemental)

CABINETMAKING AND MILLWORK

UNIT H - TOPIC 6

Door Construction (Stock)

LESSON OBJECTIVE:

To familiarize the apprentice with the standards of construction applying to stock doors.

STUDY ASSIGNMENT:

1. Commercial Standard CS73-48, pp. 1 to 27
2. Study complete Information Sheet for Lesson

REFERENCES:

Old Growth Douglas Fir, Sitka Spruce, and Western Hemlock Standard Stock Doors, 4th Edition, Commercial Standard CS73-48; U. S. Department of Commerce

Information Sheet for Lesson ____

IMPORTANT STUDY FACTORS:

1. Learn the minimum and maximum sizes of four common types of doors.
2. Become familiar with the general requirements of material, workmanship, sticking and construction of stock doors.
3. Be able to explain the purpose of these standards and give the history of the project.
4. Know how Grade A, B, C and millrun house doors differ from each other.
5. Pay particular attention to the types of molding on the accompanying Information Sheet.

WORK ASSIGNMENT: (Complete the following statements.)

1. The standards are a common understanding between ______________________, ______________________ and ______________________ of stock doors.
2. The four grades of stock doors are: (a) ______________ (b) ______________, (c) ______________ and (d) ______________.
3. Name four general requirements of a stock door: (a) ______________, (b) ______________, (c) ______________, (d) ______________.

(Supplemental)

UNIT H - TOPIC 6

Door Construction (Stock)

WORK ASSIGNMENT: (cont'd.)

4. A ____________________ sealer-prime coat shall be applied to all doors.
5. Doors that conform to grading rules shall be grade-stamped for ____________________ or ____________________.
6. Doors shall be graded on ____________________ sides.
7. House doors 1 1/8" thick shall be in ____________________ grade only.
8. Garage doors are manufactured for ____________________ finish in ______________ quality only.
9. Give the meaning of the letters F.D.I. and the numerals used in the grade marking symbols.
10. Name four types of moldings used on stock doors and sketch the design of each:

    a.

    b.

    c.

    d.

(Supplemental)

1r. Fill in the chart below giving the requirement for each grade:

	HOUSE DOORS		
Grade	Stiles, rails & mullions	Panels - Flat	Panels - Raised
"A"			
"B"			
"C"			
Millrun			

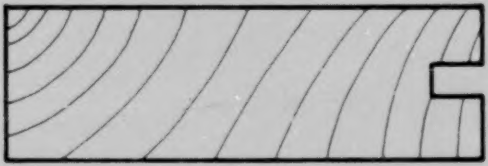
(Supplemental)

UNIT H - TOPIC 6

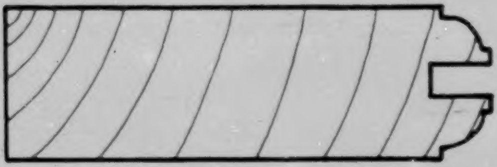
Door Construction (Stock)

TYPES OF MOLDING FOR STOCK DOORS

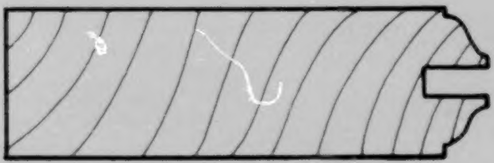
Modern designs of doors embrace both the plain features of flush panels and the gracefully molded stiles and rails with inset panels. The drawings on this page show types of solid molded stiles and rails that are most commonly used.



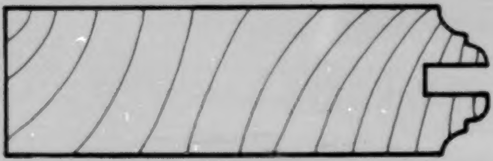
SQUARE



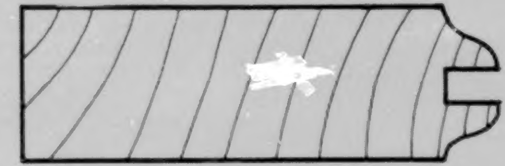
OVOLO



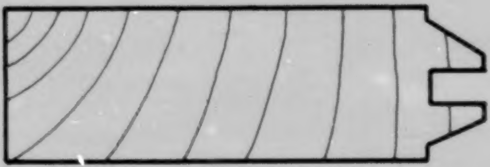
COLONIAL or REVERSE O.G.



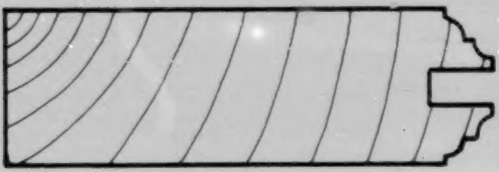
COVE and BEAD



O.G.



PEE GEE



BEAD and COVE

(Supplemental)

CABINETMAKING AND MILLWORK

UNIT H - TOPIC 7

Door and Sash Hardware

LESSON OBJECTIVE:

To show the apprentice some of the hardware for doors and sash and where the hardware and/or information can be obtained

STUDY ASSIGNMENT:

Assignment sheets 08.07.22.01 to 08.07.22.06

REFERENCES:

Hardware catalogs
Builders Hardware Catalog by Yale
Sweets References

IMPORTANT STUDY FACTORS:

Discover where you can obtain any hardware information you may need.

WORK ASSIGNMENT:

Study and research questions on assignment sheets 08.07.22.01 to 08.07.22.06.

Have hardware representative in to lecture if possible.

INTRODUCTION TO NEXT LESSON:

Kitchen Cabinets, base and upper units

CABINETMAKING AND MILLWORK

UNIT H - TOPIC 7

Hardware for Cabinet and Doors

LESSON OBJECTIVE:

To acquaint the apprentice with the various types of hardware available; also, the metals, methods, and finishes used in manufacturing this hardware.

STUDY ASSIGNMENT:

1. Retail Training Course, pp. 1-64
2. Builders' Hardware Catalog, by Yale, pp. 1-50; note illustrations on 61S, 70S, 93A, 93B, 93C and 93D

REFERENCES:

1. Retail Training Course, by Yale and Towne Manufacturing Company
2. Builders' Hardware Catalog, by Yale

IMPORTANT STUDY FACTORS:

1. Learn the basic difference between cast, wrought, forged, drawn and extruded metals.

2. Learn the two major classifications of metals used in builders' hardware.

3. Be able to explain what an alloy is.

4. Learn the comparative durability of aluminum, brass, bronze, and copper and learn what other metals are used in manufacture of hardware.

5. Study the manufacturing methods used in manufacturing hardware.

6. Be able to tell how springs are manufactured.

7. Be able to describe the different finishes used on hardware and how they are applied.

WORK ASSIGNMENT: (Complete the following statements.)

1. Wrought metal is produced by passing ____________________ of hot metal between ________________________________.

UNIT H - TOPIC 7

Hardware for Cabinet and Doors (cont'd.)

WORK ASSIGNMENT: (cont'd.)

2. Forging metal is the art of shaping metals in the solid state by the application of ____________________ ____________________.

3. Drawn metal is produced by ____________________ it through ____________________ usually while ____________________ except in making wire.

4. Metals may be classified as ____________________ and non-____________________.

5. An alloy is a compound of two or more ____________________ elements or of ____________________ and non-metallic elements.

6. In general alloys are ____________________ and ____________________ than pure metals.

7. The two general classes of springs are ____________________ springs and ____________________ springs.

8. The two purposes of finish on hardware are to ____________________ and ____________________.

9. The two general classifications for natural finishes are ____________________ and ____________________.

INTRODUCTION TO NEXT LESSON:

UNIT H - TOPIC 7

Hardware for Sash

LESSON OBJECTIVE:

To acquaint the apprentice with the various common types of sash hardware and determine its correct use.

STUDY ASSIGNMENT:

1. Retail Training Course, pp. 89-99
2. Builders' Hardware Catalog, pp. 34, 35, 36, 37, 71S, 94, and 95.

REFERENCES:

1. Retail Training Course, by Yale and Towne Manufacturing Co.
2. Builders' Hardware Catalog, by Yale

IMPORTANT STUDY FACTORS:

1. Learn the difference between overhead pulleys and side pulleys.
2. Be able to tell when to use round weights and flat weights.
3. Learn the different sizes and uses of sash cord and chain.
4. Learn the advantages and disadvantages of balances.
5. Be able to describe the hardware used on casement sash.

WORK ASSIGNMENT:

1. Overhead pulleys are used on wide ____________________windows.
2. If weights are used with narrow trim, they must be _______________weights.
3. Sash cord ranges from _______________in diameter to _______________diameter.
4. Sash chain ranges in size from number _______________to number ____________.
5. The use of sash balances instead of weights allows a ____________________ rough opening.

UNIT H - TOPIC 7

Hardware for Sash (cont'd.)

WORK ASSIGNMENT: (cont'd.)

6. Casement sash that open out require a mechanical ____________________.

7. Casement hinges that allow the outside of an out-swinging casement to be cleaned from the inside are called ____________________ hinges.

8. The hardware used on the check rail of a double-hung window is called a sash ____________________.

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT H - TOPIC 7

Hardware for Sash (cont'd.)

FITTING HARDWARE

1. In which one of the following ways are standards mounted in low-cost cabinets? 1.______

   1. Recessed into a dado
   2. Mounted on the surface
   3. Set into a rabbet
   4. Mounted in a groove

2. One of the following materials is not applied to painted cabinets during final installation of hardware. Which one is applied at some other time? 2.______

   1. Glass
   2. Metal trim
   3. Lighting fixtures
   4. Veneer

3. Which one of the following door catches needs a hole bored in the edge of the door? 3.______

   1. Magnetic catch
   2. Table catch
   3. Friction catch
   4. Ball catch

4. Installation of precision hardware requires a craftsman having a high degree of skill in the use of hand tools and a knowledge of: 4.______

   1. Assembly procedures
   2. Fitting requirements
   3. Finishing procedures
   4. Lighting requirements

5. The hinge that is most frequently used in cabinetwork is the 5.______

   1. Butt hinge
   2. Screen hinge
   3. Pivot hinge
   4. Continuous hinge

6. A surface hinge requires: 6.______

   1. A dado
   2. No recess
   3. A mortise
   4. No screws

7. Back plates are provided as part of which one of the following items? 7.______

   1. Casters
   2. Glides
   3. Table catches
   4. Cabinet knobs

8. Which one of the following finishes is recommended for hardware that is to be attached to painted cabinets? 8.______

   1. Chromium plated
   2. Polished brass
   3. Stainless steel clad
   4. Nickel plated

UNIT H - TOPIC 7

Hardware for Sash (cont'd.)

FITTING HARDWARE (cont'd.)

9. Mortising is the neatest means of installing which one of the following door hinges? 9.______

   1. T hinge
   2. Butt hinge
   3. Hinge hasp
   4. Concealed hinge

10. Metal extension drawer slides operate most efficiently when they are: 10.______

    1. Precisely fit
    2. Well oiled
    3. Quickly installed
    4. Slightly angled

CABINETMAKING AND MILLWORK

UNIT I - TOPIC 1

Millwork Operations Job Planning

LESSON OBJECTIVE

To teach the apprentice the proper sequence of routing a job through the shop.

STUDY ASSIGNMENT:

Study thoroughly the complete information sheet.

REFERENCES:

Information Sheet 09.01.23.02

IMPORTANT STUDY FACTORS:

Learn why it is important to plan a job.
Learn why a sketch or detail is important.
Be able to explain why a cutting bill should be made before you start cutting material.
Learn why all glued stock should be glued as soon as possible.
Be able to explain why drawers and doors are machined before the last operation.

WORK ASSIGNMENT:

The apprentice should write out the operations in their proper sequence for a small cabinet with doors and drawers.

1. A job must be planned to avoid ______________________.
2. A sketch or detail must be sufficient to convey a ___________ or idea to another person.
3. A cutting bill should always be made regardless of how small a job may be to avoid _________________ some parts.
4. All gluing should be done as _________________ as possible to avoid delay in machining.
5. All net sizing is done on the _________________ saw.
6. The materials are not ready for final assembly until they are properly ____________________.
7. The last materials to be machined are the ______________ and ______________.

INTRODUCTION TO NEXT LESSON:

Stock cutting for cabinet work.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1 - INFORMATION SHEET

Millwork Operations Job Planning

FOREWORD:

Job planning is one of the most important functions any tradesman is required to perform. Regardless of how good a mechanic the workman is, if he cannot lay out his work in an orderly manner and follow a sequence that will not cause repetition of setups and loss of time, he will never reach the top of his profession.

It is therefore very important that the apprentice devote considerable time and study to the proper technique of job planning or the laying out of his work in advance of starting a job.

DETAILING:

The first step in a well planned job is to make the details. Sometimes this can be the simplest of sketches, other jobs require an elaborate detail, but in any event it must be sufficient to convey the thought or mental picture of the job to be done to others, as well as retain this thought or mental picture for the originator.

BILLING:

The second step of a well planned job is the billing of the material. This is a complete lesson in itself, and is taken up at another time in this course, but is a very important step.

STOCK CUTTING:

The third step of a well planned job is the stock cutting. This also is a complete lesson and will be taken up in a following assignment.

GLUING:

After the stock is cut, all material that must be glued up in wider widths or greater thicknesses should be glued so it will be ready to dress and size with the rest of the materials.

STICKER WORK, MORTICING AND TENONING:

Any materials that must be run through the sticker should be stuck at this time and all morticing and tenoning should be done so the bench mena can have all face frames, drawer frames, etc. glued in time to be sanded and ready for the final assembly by the time the rest of the material is ready.

UNIT I - LESSON 1 - INFORMATION SHEET (Continued)

PLANING:

Any materials that must be dressed to special thicknesses should be taken to the planer and dressed as required.

TRIMMING:

The material should then be moved to the trim saw. Everything, including drawer frames, should be ripped to net width and cut to net length, then any grains, plows, rabbets, or miters that are required should be made. In fact, everything with the exception of drawers and doors, if any, is machined ready for the final assembly.

SANDING:

All materials that require sanding should then go to the belt sander or drum sander as the case may be, and be sanded.

FINAL ASSEMBLY:

After the materials are properly sanded they go to the benchmen for final assembly.

MACHINING OF DRAWERS AND DOORS:

Inasmuch as the drawers and doors are the last materials needed by the benchmen, they are machined out by the trim saw man while the rest of the materials are being sanded and assembled.

Finally: If this schedule of job planning is followed, the work will flow through the shop in an uninterrupted stream with no back tracking or waiting for materials.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1

Millwork Operations Stock Cutting

LESSON OBJECTIVE:

To provide the apprentice with basic knowledge necessary to become an accurate and efficient cutter and to enable him to overcome some of the unnecessary waste of time and materials.

STUDY ASSIGNMENT:

Study thoroughly the Information Sheet 09.01.24.03
Standard Grading Rules for Western Pines, pp. 3-9, 12-84, and 119-210.
Larch of the Western Pine Region, pp. 1-12 and 17-41.
Douglas Fir of the Western Pine Region, pp. 1-14 and 19-53.
White Fir of the Western Pine Region, pp. 1-54.

REFERENCES:

Information Sheet 09.01.24.03.
Standard Grading Rules for Western Pines, Western Pine Association.
Larch of the Western Pine Region, Western Pine Association.
Douglas Fir of the Western Pine Region, Western Pine Association.
White Fir of the Western Pine Region, Western Pine Association.

IMPORTANT STUDY FACTORS:

Learn why "Shop" grade of lumber is commonly used for stock cutting.
Learn the proper procedures in stock cutting.
Be able to give the distinguishing pecularities of Larch, both in the tree and finished wood.
Be able to describe douglas Fir and the supply at the present in the United States.
Be able to describe White Fir and give the differences between Douglas and White Fir.
Note the differences in grading of White Fir, Larch, and Douglas Fir.
Memorize the manufactured sizes of lumber and the dimensions of timbers.

WORK ASSIGNMENT:

1. To cut the material on the cutting bill included in references for this lesson, the cutter would need approximately ________ lineal feet of 3/4" x 9-3/4" stock, ________ lineal feet of 3/4" x 7-1/2" stock, and approximately ________ lineal feet of 3/4" x 2-1/2" stock.
2. A cutter should always rip his ________ stock first.
3. Rough stock should be ripped at least ________ wider than the net size and cut ________ longer than the net length.

4. Should the material be ripped or cut to length first? ________
5. Would you consider Larch as a good wood for first class millwork? ________
6. Would Larch and Doublas Fir be preferable to Pine for sash and door stock in the Puget Sound area? ________
7. Is White Fir as serviceable as Douglas Fir for interior millwork? ________
8. Are the clear cuttings of the shop grades of lumber of as good quality and texture as the select grades? ________
9. What western soft wood tree is a conifer, but not an evergreen? ________
10. A crack in the wood structure of a piece of lumber, usually running lengthwise, is called a ________.
11. The pith or spongy center of a tree when appearing on the surface of a piece of lumber is called ________.
12. An area on a piece of lumber that failed to surface is called a ________.
13. A portion of a branch or limb of a tree when appearing in a piece of sawn lumber is called a ________.
14. A pin knot is one not over ________ in diameter.
15. A small knot is one not over ________ in diameter.
16. A large knot is one that is over ________ in diameter.
17. A well defined opening in the wood fiber which holds or has held pitch is called a ________,
18. A defect caused by the bark of a tree showing on a piece of lumber and thereby destroying the square edge or edges is called a ________.
19. A curve across the grain or width of a piece of lumber is called a ________.
20. The standard manufactured thickness for a piece of 4/4 lumber is ________; 6/4 is ________; 8/4 is ________; 12/4 is ________.
21. The thickness for dimension lumber and timber is 2"-- ________; 3"-- ________; and 4"-- ________.

INTRODUCTION TO NEXT LESSON:

Manufacture of Kitchen Cabinets.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1 - INFORMATION SHEET

Millwork Operations Stock Cutting

FOREWORD:

There are very few jobs in a detail shop where a millman has the opportunity to save as much material (or money) for the employer as the stock cutter. An inexperienced or irresponsible cutter can waste several times the amount of his wages each day. For these reasons a highly skilled, ambitious cutter commands one of the highest wage scales in the shop.

SELECTION OF MATERIALS:

Because most of the material used in a detail shop is less than 6" wide and under 6' long, a grade of lumber known as "Shop Lumber" is generally used for soft wood work. This lumber is of a very high quality, but does contail knots of varying size, spaced at various distances, depending upon the "Grade Number" of the shop lumber. Recently a new grade called "Inch Factory Select" has been added to the shop grades.

At this time the apprentice should study very carefully the sample cutting bill included with this Information Sheet. It should be given as much consideration as the first assignment on a new job.

The first thing a cutter must do before starting the actual cutting is to group the different items on the cutting bill as to kinds of material and widths. This grouping will enable the cutter to know the exact number of lineal feet to be ripped in each width. On small orders some widths can be grouped to an advantage where the time saved will be greater than the material lost. For instance, if the cutting bill calls for 21 lineal feet of 3/4 x 2-1/2" net pine and 10 lineal feet of 3/4 x 2-1/4" net pine, it would be more economical to rip two 16 foot pieces wide enough to finish 2-1/2" and cut both the 2-1/4" and 2-1/2" stock out of this. (This does not follow sample cutting bill.)

RIPPING:

The first actual machine operation the cutter does is to rip the lineal stock, after determining the width to be allowed for machining. This varies in different shops and with different methods of manufacturing. The length and condition of the stock must also be taken into consideration. If the cutter has access to a "straight line rip saw," upon which to do the ripping, the rough stock can be ripped closer to net size than if the material is to be ripped rooked. One thing a new cutter must always remember is to leave enough stock so that the material will be the full net width after straightening. Detail millwork must be straight and true to size.

In most cases 1/4" is enough to allow for machining unless the material is extra long or crooked or both. If it is either extra long or crooked, allowances must be made for these conditions. If for instance, the cutting bill calls for 1 piece, 3/4 x 7-1/2 - 14'6" G2E, it is much better to leave the rough 1/4" too wide than to waste the whole piece by not having it wide enough.

After the like materials have been grouped, it may be found that there will be required--

126 lineal feet, 3" net pine
264 lineal feet, 2-1/2" net pine
120 lineal feet, 2" net pine
48 lineal feet, 1-1/2" net pine

and possibly,

26 lineal feet, 3/4" net pine.

If all of the 3/4" net is 18" or shorter in length, it is best not to rip the 3/4" net stock at all to start with, but get it out of the scrap that is left after the rest of the materials have been cut. Always rip the widest stock first and be sure to rip a few extra feet to take care of knots and other defects that will have to be cut out. Rip a little extra on the wider widths so it can be ripped back to narrower widths or kept for the next order. It is much better to rip a little extra than to have to stop cutting and make an extra trip to the lumber pile to get a few extra feet. (Remember that this pertains only to softwood cutting that is more or less a continuous job, and not hardwood cutting for special jobs.)

CUTTING:

After the material is all ripped to rough width it is now ready for cutting. For most work the stock is cut 1" over the net length. In cutting, as in ripping, start with the widest stock first and always cut the longest lengths first.

The marking of the stock after it is cut is of the utmost importance. Be sure that the top piece of each size is marked with all the information necessary for the next job. The sizes marked on the cut stock are always net sizes the same as on the cutting bill. For example, if the sixth item on the cutting bill calls for 3 pieces, 3/4" x 7-1/4" - 4' 2" W.P. G1S2E, the top piece on this pile should be marked as follows: #6 - 3 pieces, 3/4" x 7-1/4" - 4' 2" W.P. G1S2E. If the cutting bill should show a tenon or sticking on these particular pieces, this information should also be put on the stock. Always remember that the next person to handle the material may not know what it was cut for, unless it is plainly marked.

Always keep the cut stock piled in neat piles with enough strips so that it will stay in neat piles and not get mixed up before it gets on to the next man.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1

Millwork Operations Kitchen Cabinets

LESSON OBJECTIVE:

To provide the apprentice with information so that he will understand the manufacturing of all types of kitchen cabinets.

STUDY ASSIGNMENT:

Architectural Woodwork Design, pp. 116-133

REFERENCES:

Architectural Woodwork Design Book No. 505, Curtis Co., Inc.

IMPORTANT STUDY FACTORS:

Pay particular attention to the various types of kitchen cabinets.
STudy the door and drawer arrangement in each style of kitchen cabinet.
Learn how to layout cabinets for machining.

WORK ASSIGNMENT:

1. The upper cabinet should not be more than ______ above the work top of lower cabinet.
2. The toe hole should be at least ____________ on lower cabinet.
3. The standard height for lower cabinet is ____________.
4. The sink should be ____________________ into top.
5. Wherever possible avoid showing ______________ grain.
6. The upper cabinets can have __________ or ____________ shelves.
7. For good construction always have ______________ for drawers.
8. Face frames should have ____________ and ______________ or ______________ joints.
9. Always have a ________________ of some kind under a sink.
10. Drawers should line up ___________________ with other objects.

INTRODUCTION TO NEXT LESSON:

Continuation of above.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1

Millwork Operations Kitchen Cabinets

LESSON OBJECTIVE:

To provide the apprentice with information so that he will understand the manufacturing of all types of kitchen cabinets.

STUDY ASSIGNMENT:

Architectural Woodwork Design, pp. 116-133

REFERENCES:

Architectural Woodwork Design Book No. 505, Curtis Co., Inc.

IMPORTANT STUDY FACTORS:

Pay particular attention to the various types of kitchen cabinets.
Study the door and drawer arrangement in each style of kitchen cabinet.
Learn how to layout cabinets for machining.

WORK ASSIGNMENT:

Make a drawing of a set of kitchen cabinets that you would like to install in a new home.

1. Lay them out on a rod.
2. Make a complete cutting bill for these cabinets.

INTRODUCTION TO NEXT LESSON:

Installation: California Workbook, Part 3, Topic 5, pp. 81-84.

CABINETMAKING AND MILLWORK

INFORMATION SHEET UNIT I - LESSON 1

Millwork Operations Lay-Out (Job Lay-out)

LESSON OBJECTIVE:

To point out to an apprentice many of the things (exclusive of cabinet construction) that must be taken into consideration before actual construction begins.

STUDY ASSIGNMENT:

Study the complete Information Sheet for this Lesson.

REFERENCES:

Information Sheet for this Lesson.

IMPORTANT STUDY FACTORS:

Learn what a buyer submits to get a bid on a job and why they are seldom accurate.
Learn what to watch for when matching existing fixtures.
Be able to explain why the size of an elevator could be important.
Be able to explain why the floors and wall are important to the layout man.
Learn why it is important that all measurements be checked on the job.

WORK ASSIGNMENT:

1. The first thing a layout man is given is a set of ________________.
2. The three most important features in matching existing fixtures are ___________, ________________, and ________________.
3. The layout man must be sure he can get the finished job __________ of the shop and _____________ the building where it is to be installed.
4. The layout man must know whether or not the floors are _____________ and the wall _____________.
5. Because of the fact that most plans are drawn before the building is started all __________________ must be checked on the ____________________.

INFORMATION SHEET UNIT I - LESSON 1

Millwork Operations Layout (Job Layout)

This lesson should not be confused with a previous Lesson, Job Planning. There are several things that must receive consideration when an order first enters the shop. An explanation of these items will be given so that an apprentice will better understand some of the problems encountered in layout. In this lesson, references will not be made to an order for a single cabinet or counter, but rather to a complete job, whether on new construction or the remodeling of or addition to an existing establishment.

A set of plans usually accompanies an order from which a layout man or detailer may obtain an overall picture of the job, and from which he learns that several problems have to be solved before the actual construction of the cabinet work begins. If the cabinet work is made up of a number of small units and the job is new construction, the layout man will encounter few difficulties, but if it is for the expansion of an existing building or the cabinet work is large, the building in which it is to be set will have to be checked before actual construction begins.

If the cabinet work is to match existing work, a very careful study of materials, hardware and design should be made.

If the cabinet work is exceptionally large or of extreme heighth, particular notice must be made of the openings in the building, the size of the elevators, the dimension of the halls and any other obstructions that might be encountered in delivering the finished work.

After this information has been obtained, the layout man will know whether the entire cabinet can be delivered in one piece or in sections. During the visit to the site of delivery, the level of the floors and the plumb of the walls should also be checked. Quite often such things as pipes, posts and pilasters will be encountered and will have to receive special consideration. In residential work the layout man must know the exact location of water pipes and drains and in some cases hot and cold air ducts.

In letting jobs of large size, the plans are often drawn before the building is started or while it is in progress, thereby making it impossible to get accurate measurements. For this reason, the layout man should always check the measurements on the job before he starts any layout work that depends on existing point or points in the building.

After all of the above stated factors have been taken into consideration and only then is the layout man ready to begin the actual layout whether it be in detail, rod, or panel.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1

Installation Requirements

LESSON OBJECTIVE:

To teach consideration for installation requirements before construction.

STUDY ASSIGNMENT:

Interior Finish, U.B.C. pp. 36-41

REFERENCES:

Interior Finish, U.B.C., pp. 36-41.

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

California Workbook, Part 3. Study and answer questions pages 81 through 83.
Calfiornia Testbook, Part 3. Answer questions on pages 41 and 42.

INTRODUCTION TO NEXT LESSON:

California Workbook, Part 3, pp. 85-88.
California Testbook, Part 3, pp. 43-44.

CABINETMAKING AND MILLWORK

INFORMATION SHEET UNIT I - LESSON 1

Installation Requirements

INTRODUCTION:

This topic is planned to help the apprentice find answers to the following questions:

1. Why is field measurement an important factor in cabinet and fixture installation?
2. What are the steps of field measurement?
3. What procedures are followed in the installation of cabinets and fixtures?
4. What tools and materials are needed for installing cabinets and fixtures?

The installation of cabinets and fixtures, a specialty within the cabinetmaking trade must be directed by skilled craftsmen who have extensive trade experience. Accurate and comprehensive field measurement is a prerequisite to installation; the informationgained from such measurement can affect the final size and design of the cabinetwork.

FIELD MEASUREMENT:

Field measurement is the process of determining whether the dimensions of the cabinet-installation areas of a newly constructed building are in accordance with the proposed cabinet dimensions shown on the shop drawings. Such measurement is required because structural, electrical, or other features of the building may have been revised in the course of the building's construction, and these revisions may make changes in the size or design of the cabinetwork necessary. When field measurement reveals a conflict of this kind, the fixture contractor informs the architect, who must see that the differences are resolved before fixture construction proceeds. The following procedure must be adhered to in taking field measurements:

1. Measure rooms from finish wall to finsih wall and from finish floor to finish ceiling.
2. Measure each wall that has recesses or column projections to locate these features.
3. Measure free-standing columns from cneter to center.
4. Measure to establish the locations of ducts, vents, plumbing, and electrical outlets, and other special construction features.
5. Measure the height and width of doors, windows, corridors, elevator landings, and stairways.
6. Take the measurements needed to make the required templates for curves or other contours that cannot be laid out directly from linear measurements.
7. After field measurement has been completed, discuss with the workers in other crafts any points they must understand about the requirements of the cabinetwork installation.

INSTALLATION PROCEDURES:

The men who are to perform the cabinetwork installation should acquaint themselves fully with all the relevant details of the site before the fixtures are delivered. They should determine the readiness of the site to receive the cabinets; study the floor plan to establish the best sequence of installation for the work; and arrange for the coordination of the cabinetwork installation with the activities of workers

INSTALLATION PROCEDURES (Continued):

in other trades. In general, a new building is ready for the installation of cabinets and fixtures when the doors and windows are in place and can be locked, the plaster is dry, and the humidity is relatively low.

On a large project, preliminary layout--establishing the level lines, center lines, base lines, and contour lines on the walls and floors of the cabinetwork installation site--is generally performed when the fixtures are delivered. These lines must be precisely laid out and marked if fixtures are to line up properly and join inconspicuously, since the fixtures are delivered "prefitted," which means that they have been built and fitted in the shop to the dimensions required for the particular installation.

To follow most installation procedures, an installer must have a complete set of hand tools and an assortment of rough hardware, including bolts, nuts, washers, screws, nails, and various other kinds of fasteners, along with such materials as dowels, glue, and sandpaper. The size of the installation job will determine whether he will need such equipment as work benches, clamps, sawhorses, and scaffolding. A portable power saw, jointer, or band saw may be needed on a large job.

In gneral, wall fixtures are installed first and floor fixtures next. The members of fixtures are customarily scribed to ensure their accurate fit in their respective places. All joints should be secured with screws, and all fastenings should be concealed. Nails should never be driven into the face of any fixture. Fixtures that require connection to utility outlets (for plumbing or electricity, for example) must be hooked up for service by craftsmen in the appropriate trades. Glass, mirrors, hardware, special metalwork, and similar items are generally fitted and attached to the fixtures at the cabinet shop, but in some instances they are fitted at the shop and attached at the job site.

Cabinets and fixtures must be handled carefully in the course of their prefitting, delivery, and installation to prevent damage to their finish. The installation is complete and ready for the architect's or the owner's inspection when all fixtures have been fastened in place, any necessary touch-up or repair has been accomplished, all installation equipment has been removed, and the site has been swept clean.

ASSIGNMENT:

Interior Finish, United Brotherhood of Carpenters and Joiners of America, pp. 36-41.
Specification Guide for Cabinet and Fixture Work, Cabinet and Fixture Manufacturers Guild of California. Read the material relating to field measurements, delivery, and installation, pp. 3, 4, and 18.

CHECKUP:

Read each statement and decide whether it is true or false. Circle T if the statement is true; circle F if the statement is false.

1. Cabinets must not be installed in a room until the plastered walls are dry. — 1. T F
2. The prefitting of fixtures is accomplished during installation. — 2. T F
3. Glass and mirros are attached to cabinetwork by cabinetmakers. — 3. T F
4. Floor fixtures are usually installed after wall fixtures. — 4. T F

CHECKUP (Continued):

5. Templates are necessary for cabinet installation if the walls of the site are curved. 5. T F
6. Preliminary layout has usually been completed before fixtures are delivered to the job. 6. T F
7. Field measurements are taken between a room's finish walls and between the finish floor and the finish ceiling. 7. T F
8. All ceiling-height casework is delivered to a job completely knocked down. 8. T F
9. In the proper installation of a wardrobe, the face frame line is located before the finished end is scribed. 9. T F

10. If the story pole shows that horizontal grounds are correctly located, no check for level is needed. 10. T F

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1

Test on Installation

Listed below each numbered item are four possible answers or completing phrases. Decide which of the four is correct, or most nearly correct; then write the corresponding number (1, 2, 3, or 4) in the blank space to the right of the item.

1. Several conditions must be met before the job site can be considered ready for the installation of cabinetwork. Which one of the following conditions does not apply? 1. ______

    1. Plaster must be dry.
    2. Humidity must be relatively low.
    3. Plumbing and electrical work must be completed.
    4. Doors and windows must be installed.

2. Field measurements are made from: 2. ______

    1. Subfloor to ceiling joists.
    2. Finish floor to finish ceiling.
    3. Finish floor to ceiling joists.
    4. Subfloor to finish ceiling.

3. Layout measurements for mill-built cabinets are usually made: 3. ______

    1. After Partitions are set.
    2. Before partitions are set.
    3. From the architectural drawings.
    4. As soon as the subfloor is laid.

4. The first step in the installation of mill-built cabinets is to: 4. ______

    1. Place each cabinet near its final location.
    2. Order any omitted cabinet parts.
    3. Sort out drawers and doors.
    4. Plane off excess stock.

5. Some mill-built cabinetwork items must be delivered to the job partially knocked down. Which one of the following types of mill-built cabinetwork is usually delivered in this form? 5. ______

    1. Mantels
    2. Wardrobes
    3. Bookcases
    4. Sink pullmans

6. If field measurements reveal that the location of a fire hose panel coincides with the location proposed for a wall-hung cabinet, the necessary adjustment must be worked out by the: 6. ______

    1. Fixture manufacturer
    2. Job foreman
    3. Architect
    4. Owner of the building

Test on Installation (continued)

7. For a large cabinet installation, the layout lines at the job site are usually drawn: 7. ______

   1. From the architectural drawings.
   2. When the fixtures are debing built.
   3. From the shop drawings.
   4. When the fixtures are delivered.

8. Mill-built cabinets must be built: 8. ______

   1. In modular sizes.
   2. According to the architect's specification.
   3. To permit knocked-down delivery.
   4. Of solid lumber.

9. Cabinetwork should be delivered only if the humidity at the job site is: 9. ______

   1. Below 50 percent.
   2. Below 60 percent.
   3. Above 40 percent.
   4. Below 70 percent.

10. In laying out walls for cabinets, ensure that: 10. ______

    1. Cabinets will have proper toe space.
    2. Spacing between cabinets and opening trim will be uniform within the room.
    3. The sink pullman will not be centered under a window.
    4. Interference between drawers will be encountered only at cabinet corners.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1

Residential Cabinets

LESSON OBJECTIVE:

To teach the apprentice about residential cabinets.

STUDY ASSIGNMENT:

Cabinet Making (Mill.) U.B.C., pp. 46-51
Cabinetmaking and Millwork, Daul and Wilson, pp. 222-246.

REFERENCES:

Cabinet Making (Mill.) U.B.C.
Cabinetmaking and Millwork, Dahl and Wilson

WORK ASSIGNMENT:

California Workbook, Part 3, pp. 85-88. Study and answer questions.
California Testbook, Part 3, pp. 43-44. Answer questions.

INTRODUCTION TO NEXT LESSON:

California Workbook, Part 2, pp. 83-88.
California Testbook, Part 2, pp. 85-86.

UNIT I - LESSON 1 INFORMATION SHEET

Residential Cabinetwork

INTRODUCTION:

This topic is planned to help the apprentice find answers to the following questions:

1. What are the general classifications of residential cabinetwork?
2. What are the special features of residential cabinetwork for kitchens and baths?
3. What types of glass are used in residential cabinets?

Although residential cabinetwork and sash and door work are considered in some areas to be separate industries, the millman must be prepared to undertake work in both of these categories. He should be familiar with such generally accepted standards for mill-built residential cabinetwork as those given in the Manual of Millwork, published by the Woodwork Institute of California. The architect uses such standards in preparing mill cabinet work construction specifications.

The term "residential cabinetwork" means those cabinets and built-in units used in houses, motels, apartments, and dwellings in general. The greatest part of today's residential cabinetwork is found in kitchens and baths, but the category includes general storage units and such miscellaneous units as bookcases and room dividers.

RELATED INFORMATION:

Residential cabinetwork items can be grouped as follows: lower cabinets, including kitchen sink units and the like; wall-mounted cabinets; bathroom vanities; storage units, such as linen closets and wardrobes; and miscellaneous household units, such as mantels and bookcases.

KITCHEN CABINETS:

Kitchen cabinets are of four classes: the sink unit, which houses the dishwasher and the garbage disposal device as well as the sink; the work unit, which contains drawers and shelves for storage and includes such utility items as pullout bread boards and counter-top meat boards; the stove and oven units, which may be considered together as a single class and which are employed to mount the range top and the oven respectively; and the food bar, at which informal meals are served. The food bar may include space for storage, and it generally functions as a divider between the kitchen and an adjoining area of the house.

Lower kitchen cases have a standard overall height of 36 inches. The basic casework will vary in height, depending on the material--ceramic tile, laminated plastic, hardwood, or stainless steel--used in the construction of the counter top. A tile top will contribute 1 inch to the overall height of the case; a laminate-covered top, 3/4 inch; a hardwood top, 1-5/8 inch; and astainless steel top, about 3/4 to 7/8 inch.

Kitchen cabinetwork must be planned around the dimensions of the appliances. The standard 24-inch depth of lower kitchen cases is based on the standard dimensions of built-in dishwashers. These appliances, regardless of make, are always 24 inches wide,

KITCHEN CABINETS (Continued)

24 inches deep, and 34-1/2 inches high. Ovens of various makes differ in height and width, although in general they are of uniform depth; built-in refreigerators also differ in size. Becuase of size variations in these and other appliances, the cabinetman must check the manufacturer's catalog to confirm the size of the appliance model that is specified for the installation.

Kitchen wall cabinets are 12 inches deep, a dimension traditionally based on the size of the dinner plate. The clearance between the counter top of a lower cabinet and the bottom of the wall-mounted cabinet above it can be no less than 14 inches and may be as much as 18 inches; this allows space for storing and using such small kitchen appliances as mixers, blenders, and toasters. Wall cabinets are built in various heights; the storage space may extend to the ceiling, or it may be boxed down so that the topmost shelf is wihtin easy reach. Shelves may be stationary or adjustable. Kitchen cabinet doors may be lipped or flush, swing-out or sliding. For certain applications, the doors may have glass members, or they may be made of glass panels. Custom work often calls for doors with raised or molded panels; these are increasing in popularity as alternatives to smooth-surfaced doors.

BATH CABINETS:

A residential bathroom often includes a vanity, a fixture designed to house the sink bowl and to provide storage space for bath items. Bathroom vanities are usually 30 to 32 inches high; their depth is generally determined by the space available in the room and by the size of the bowl to be installed. Most sink bowls are from 18 to 24 inches deep, front-to-back; a standard depth is 20 inches. Vanity tops are in general either ceramic tile or laminated plastic. The cabinet doors may be lipped, flush, or sliding.

A cabinet for linen storage is sometimes included among the bathroom fixtures. It may extend from the floor to the ceiling, and its depth is usually form 14 to 18 inches. The cabinet is equipped with stationary or adjustable shelves, and may in special cases be lined with red (incense) cedar.

GENERAL STORAGE UNITS AND MISCELLANEOUS CABINETS:

Residential general storage units include hall closets, utility cabinets, linen closets, and hobby-equipment storage units. The design of these units varies widely in accordance with the purposes for which they are intended. A residential cabinetwork installation may also include such items as custom-built bookcases, room dividers, mantels, window valances, and specially designed cases for many purposes. The construction of such work is governed by the same general practices that apply in the building of other types of cabinetwork.

GLASS FOR RESIDENTIAL CABINETS:

Three types of glass are used in residential millwork--sheet glass for windows, partitions, and small cabinet doors; obsucre rolled glass for bathroom windows and other applications where privacy is desired; and novelty glass, such as bottle glass.

CABINETMAKING AND MILLWORK

ASSIGNMENT:

Cabinetmaking (Mill). United Brotherhood of Carpenters and Joiners of America, pp. 46-51.
Cabinetmaking and Millwork, Dahl, A. and Wilson, J., pp. 222-46.
Manual of Millwork, Woodwork Institute of California, pp. 40-64.

CHECKUP:

Read each statement and decide whether it is true or false. Circle T if the statement is true; circle F if the statement is false.

1. All built-in dishwashers are 36 in high. 1. T F
2. A work unit usually includes a range top. 2. T F
3. The standard depth of lower kitchen cases is 24 in. 3. T F
4. An exposed cabinet end is sometimes called a "return." 4. T F
5. The architect usually specifies the joinery for stock cabinets. 5. T F
6. The standard depth of kitchen wall cases is 12 in. 6. T F
7. Cutting boards for work units should finish not less than 3/4 in. thick. 7. T F
8. Mill-built cabinets are normally delivered without hardware. 8. T F
9. In general, lipped construction is preferred over flush construction for drawers. 9. T F
10. A drawer kicker is a hardware fitting. 10. T F

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1

Test on Residential Cabinetwork

Listed below each numbered item are four possible answers or completing phrases. Decide which of the four is correct, or most nearly correct; then write the corresponding number (1, 2, 3, or 4) in the blank space ot the right of that item.

1. The standard overall height for kitchen cabinets is: 1. ________

   1. 34 in.   3. 38 in.
   2. 36 in.   4. 39 in.

2. The contribution of a hardwood counter top to the overall height of a kitchen cabinet is: 2. ________

   1. 3/4 in.   3. 1-1/4 in.
   2. 7/8 in.   4. 1-5/8 in.

3. The kitchen appliance that is manufactured with standardized dimensions is the: 3. ________

   1. Dishwasher   3. Refrigerator
   2. Stove   4. Oven

4. In general, sliding doors are not suitable for a wardrobe if the door opening is less than: 4. ________

   1. 2-1/2 ft.   3. 4 ft.
   2. 3 ft.   4. 4-1/2 ft.

5. As a general rule, the stationary parts of stock cabinets and built-ins should be not less than: 5. ________

   1. 3/8 in. thick   3. 1 in. thick
   2. 3/4 in. thick   4. 4 in. wide

6. In most instances, a cabinet or built-in that is to fit against a finished wall does not require a: 6. ________

   1. Scribe mold   3. Header
   2. Nailing strip   4. Back

7. Wall-hung kitchen cabinets are mounted so that the bottom is no less than what distance from the counter top? 7. ________

   1. 12 in.   3. 24 in.
   2. 14 in.   4. 18 in.

8. A standard front-to-back depth for bathroom sink bowls is: 8. ________

   1. 16 in.   3. 24-1/2 in.
   2. 20 in.   4. 25-3/4 in.

9. Shelves glued for length must have edge pieces that are no less than: 9. ________

1. 1 in. thick
2. 2 in. wide
3. 3 in. wide
4. 4 in. wide

10. When built-in seats and tables are constructed, the space allowance for each person should be not less than: 10. ________

1. 20 in.
2. 22 in.
3. 24 in.
4. 30 in.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1

Production Methods in Producing Cabinets

LESSON OBJECTIVE:

To teach the apprentice to use production methods in producing cabinets.

STUDY ASSIGNMENT:

Cabinetmaking and Millwork, Dahl, Alf and Wilson, pp. 222-45.

REFERENCES:

Cabinetmaking and Millwork, Dahl, Alf and Wilson.

WORK ASSIGNMENT:

California Workbook, Part 2, Study and answer questions, pp. 83-88.
California Testbook, Part 2, Answer questions, pp. 85-86.

INTRODUCTION TO NEXT LESSON:

Development of a modern kitchen.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1 - INFORMATION SHEET

Subassembly and final assembly

ASSIGNMENT:

Cabinetmaking and Millwork, Dahl, Alf, and J. Wilson, pp. 222-45.

INTRODUCTION:

Mass production methods and machinery in the cabinetmaking field today have brought a trend toward achieving a high degree of accuracy in machining cabinet parts. This has caused a reduction in the amount of hand fitting required in the cabinet shop. However, the introduction of mass production does not necessarily mean that the need for the skilled craftsman has lessened. It has, instead, brought about the specialization in many phases of benchwork. The journeyman who has complete command of the skills of his crafts is still in demand for supervisory positions. In fact, the continuing demand for custom cabinetwork will require all the cabinetmakers that can be trained.

RELATED INFORMATION:

This topic will outline the procedures used in subassembly and final assembly operations, and the functions of the basic tools and equipment needed to perform these operations.

Subassembly operations can include any type of partial assembly that forms a component part of the whole cabinet. Final assembly refers to the assembly of all subassemblies and other component parts into the final finished cabinet or fixture. For example, in the assembly of a custom designed base cabinet containing drawers, the subassembly operations might include the following: base, drawer frames, drawers, and face frames. The final assembly of this unit would include all of the subassemblies and other component parts, such as top, bottom, sides, and back, plus any fillers and cleats that might be required. The procedure to be followed in subassembly involves prefitting the component parts of each subassembly unit before glue is applied and the cabinet is clamped. In the final assembly all subassemblies and other component parts are also prefitted. Prefitting before gluing and clamping assures that all members of the case fit together correctly.

However, if a number of cabinets are being manufactured on a production basis, the machining is performed on specialized machines, and all subassembly and final assembly operations are performed according to production methods. The prefitting of components applies only to the first cabinet as ameans of checking the accurancy of the machining. Assemblies of the remaining components are put together on a production basis. In this way subassemblies of a cabinet or fixture may be completed by one group of cabinetmakers and passed on to others for final assembly.

The group of illustrations in Fig. 40 shows the basic subassemblies and the component parts of a cabinet. The elements of the subassembly are: the drawers, the face frame, the base frame, and the drawer frame. Component parts are: the division, the end, the top, the back, and the bottom.

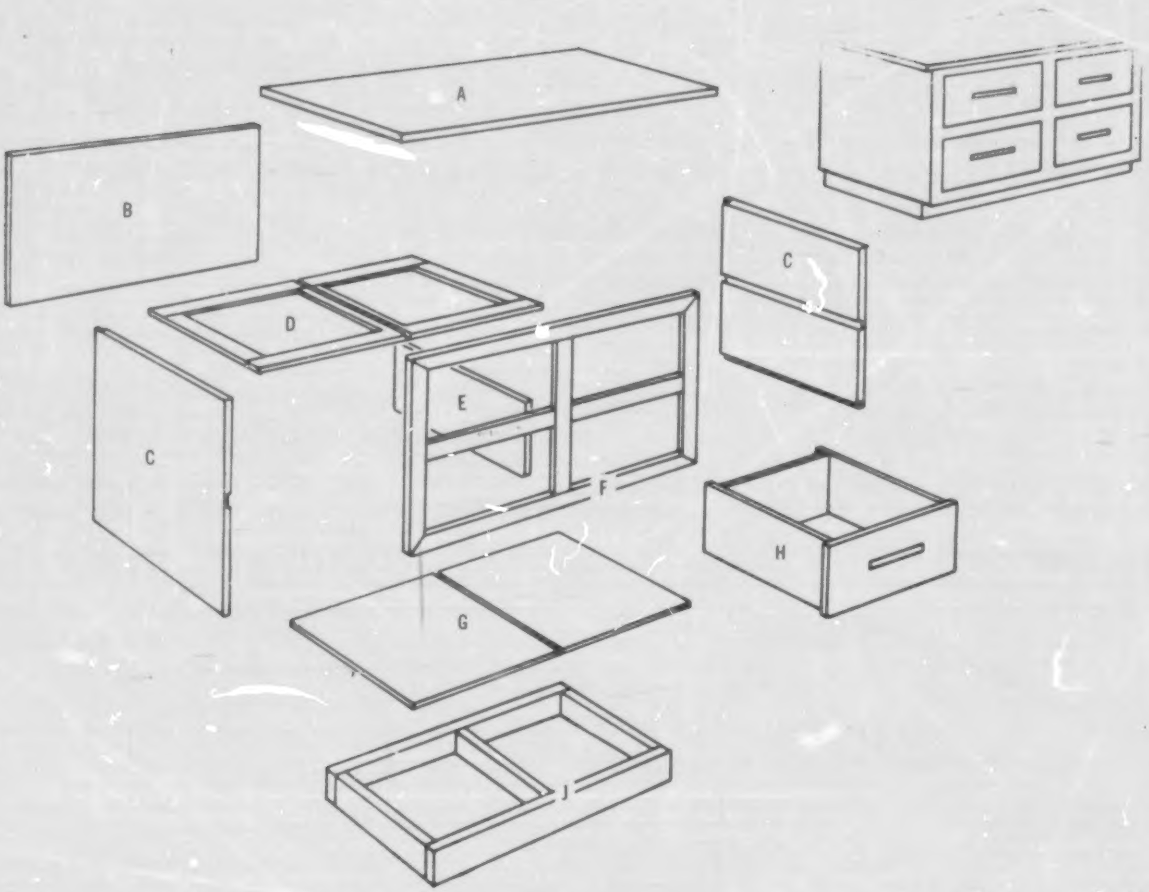


Fig. 40. Exploded drawing showing the basic subassemblies and the component parts of a cabinet (top right): (a) top, (b) back, (c) ends, (d) drawer frame, (e) division, (f) face frame, (g) bottom, (h) drawer, (j) base frame

CHECKUP:

1. The face frame of a cabinet is an element of the subassembly. 1. T F
2. Division, standard, and sleeper are terms for the same part of a cabinet. 2. T F
3. In production work it is necessary to prefit the components of only the first cabinet produced. 3. T F
4. Final assembly includes components parts and subassembly. 4. T F
5. Increase in use of mass production techniques has resulted in specialization in benchwork. 5. T F
6. Adjustable shelves are supported on wooden cleats. 6. T F
7. Paneled cupboard doors are commonly called cupboard sash. 7. T F
8. Drawer fronts are usually made 3/4" thick. 8. T F
9. A hand fitted flush drawer front is made the same size as the full size of the face opening. 9. T F
10. The term casework refers to the basic shell of a cabinet. 10. T F
11. Precision cutting is unnecessary in building an ordinary shipping crate. 11. T F
12. A kicker will prevent a drawer from tilting down when it is pulled out. 12. T F

[illegible]

UNIT I - LESSON 1 - INFORMATION SHEET

Fitting Hardware

ASSIGNMENT:

Principles of Woodworking, Holtrop and Hjorth, pp. 305-18, 320-31.

INTRODUCTION:

The purpose of this topic is to acquaint the apprentice with methods and procedures used in fitting several types of hardware used in cabinet and fixture work. The apprentice may find it helpful to examine catalogs published by hardware manufacturers. These books are an additional source of information on hardware fitting requirements.

RELATED INFORMATION:

Fitting and installing hardware may be done at one time in the cabinet shop benchwork department. This is often the procedure when cabinets are shipped unpainted to the job site. Cabinets that are to be painted or finished in other ways in the shop are generally fitted with hardware at the time the work is assembled. The hardware is then taken off, and the cabinet is sent to the paint shop. After the work has been painted, the hardware is reinstalled prior to shipment. The section of the cabinet shop in which this final installation of hardware is performed is generally referred to as the trim department. In this final phase of installation glass, metal, lighting fixtures, and other special items are also attached to the cabinet.

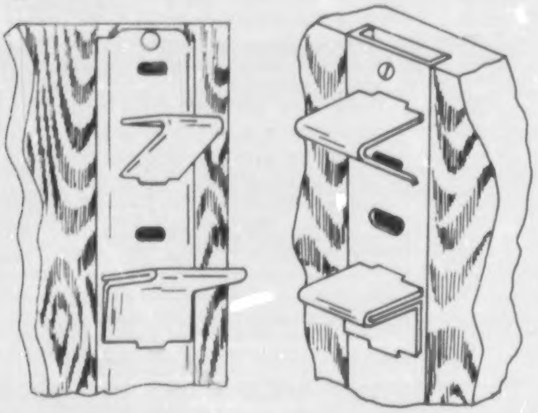
Fitting hardware properly requires skill in the use of hand tools and knowledge of the fitting requirements of various types of hardware. The cabinetmaker must be thoroughly familiar with the clearances required for the proper operation of the hardware. He must also know how much allowance is required for paint material in the grooves and dadoes that will receive the hardware.

The following illustrations show some of the more extensively used hardware in properly fitted positions. Fig. 41 illustrates a surface mounted shelf standard and brackets and a flush mounted standard and brackets. A standard is sometimes referred to as a ratchet strip.

To guide the cabinetmaker in mounting shelf hardware, the ratchet strips are provided with slots, often numbered, in which to place the shelf brackets. These numbers, from 1 to 6, are repeated in groups for the length of each ratchet and serve as guides in aligning the ratchet strips and the shelves. If each set of brackets is placed correctly, the shelf that the set supports should be level and at the same time parallel with any other shelves mounted in the same cabinet. Shelves can be checked for level by means of a jig.

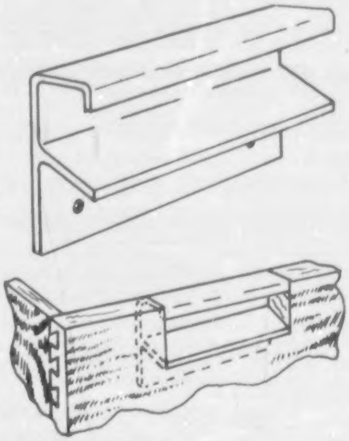
RELATED INFORMATION (Continued)

A flush-mounted drawer pull is shown in Fig. 42. The mortised cutout made in the drawer front to receive the pull is generally cut by machine, and the corners are finished with hand tools. Countersunk screws fasten the pull to the back of the front drawer panel.



Courtesy Hardware Specialties Sales Co.

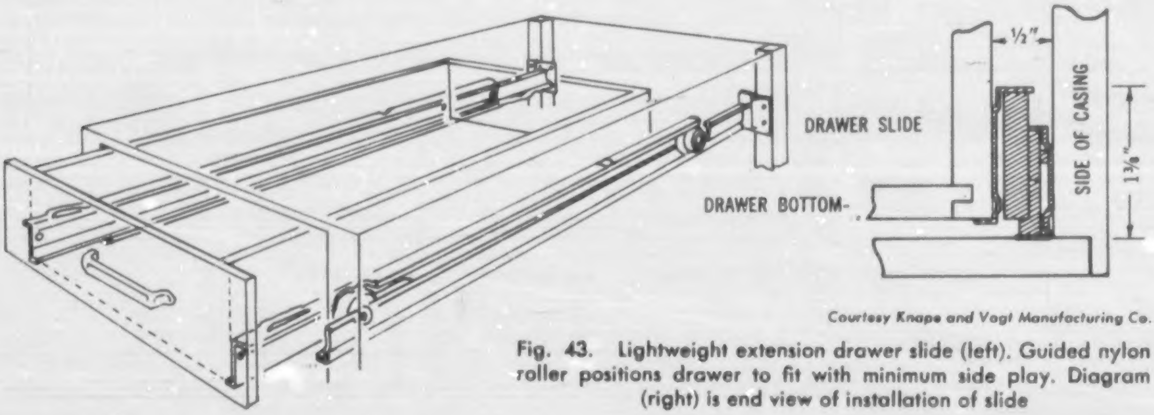
Fig. 41. Surface mounted shelf standard (left) and flush mounted shelf standard, each with brackets. Flush style requires a dado



Courtesy Garden City Plating and Manufacturing Co.

Fig. 42. Flush mounted drawer pull (top) installed in mortise (bottom) and fastened by screws through the back

Metal extension drawer slides require exact fitting to operate smoothly. When there are several drawers to be fitted with extension slides, the fitting can be done with the aid of templates or jigs. Fig. 43 shows a drawer fitted with a lightweight type of extension slide. The diagram of the end view illustrates the clearance required for this type of slide.



Courtesy Knape and Vogt Manufacturing Co.

Fig. 43. Lightweight extension drawer slide (left). Guided nylon roller positions drawer to fit with minimum side play. Diagram (right) is end view of installation of slide

CHECKUP:

1. When hanging cabinet doors with semi-concealed hinges, it is necessary to cut rabbets in the door edges. 1. T F
2. Soss hinges and surface hinges are the same. 2. T F
3. The dimensions of a lock include the distance from the selvage to the key pin. 3. T F
4. The strikes for check locks are provided with small projections to help locate their position. 4. T F
5. A pull of 8 to 10 pounds is satisfactory for a magnetic catch on the average cabinet door. 5. T F
6. A continuous hinge is used in hanging an unusually tall door. 6. T F
7. A dado is required to receive a flush mounted standard. 7. T F
8. Glide, socket, and tip are terms used in referring to types of cabinet catches. 8. T F
9. Installation of one type of table top fastener requires that a slit cut be made in the inner side of the rails. 9. T F

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1

Test on Subassembly and Final Assembly

In the blank spaces to the right below, write the number of the stage of assembly that applies to each piece of casework listed.

1. Subassembly
2. Component part
3. Final Assembly

Drawer cabinet 1. ______
Drawer 2. ______
Face Frame 3. ______
Division 4. ______
End 5. ______
Drawer Frame 6. ______
Top 7. ______
Base Frame 8. ______
Back 9. ______
Bottom 10. ______

11. Successful mass production of cabinets is dependent to a great extent on: 11. ______

    1. Availability of highly skilled craftsmen
    2. Accurate machining of component parts
    3. Large inventories of material
    4. Availability of unskilled labor

12. Prefitting cabinet parts for subassembly eliminates: 12. ______

    1. Machine operations
    2. Clamping of subassemblies
    3. Errors in subassemblies
    4. Gluing operations

13. One of the following is not a basic subassembly. 13. ______

    1. Base frame
    2. Division
    3. Drawer
    4. Drawer frame

14. In the final assembly of a cabinet, the subassemblies and other component parts must first be: 14. ______

    1. Glued
    2. Clamped
    3. Painted
    4. Prefitted

15. One of the following preparatory steps is not necessary for final assembly of a cabinet. Which one does not apply? 15. ______

    1. Laying out the clamps
    2. Prefitting the parts
    3. Preparing the glue
    4. Selecting the rough stock

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1

Developing a Modern Kitchen

LESSON OBJECTIVE:

To teach the apprentice to develope a complete modern kitchen.

STUDY ASSIGNMENT:

REFERENCES:

Sweets Catalogs. Supplimental Plan Sheets.

IMPORTANT STUDY FACTORS:

Incorporate all possible convenience items for apprentice understanding.

WORK ASSIGNMENT:

Draw plan view of kitchen.
Draw elevations of kitchen.
Divide units into various groups.
Have apprentices sketch exploded views of various items.

INTRODUCTION TO NEXT LESSON:

Miscellaneous Cabinets
California Workbook, Part 3, pp. 72-83.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1

Store Fixtures and Other Commercial Fixtures

LESSON OBJECTIVE:

To acquaint the apprentice with store fixtures and other commercial fixtures.

STUDY ASSIGNMENT:

California Workbook, Part 3, Unit E, pp. 59-71.

REFERENCES:

California Workbook, Part 3, Unit E.
California Testbook, Part 3, Topic 1 and 2.

IMPORTANT STUDY FACTORS:

Extract from the apprentices in your class all pertinent information relating to this part of their own jobs.

WORK ASSIGNMENT:

Study pages of Dahl and Wilson, Cabinetmaking and Millwork pp. 214-215, 222-246.
Answer questions on Checkup, Page 65 and 70-71.
Answer questions in California Testbook, Part 3, pp. 33-36.

INTRODUCTION TO NEXT LESSON:

California Workbook, Part 3, Unit E, pp. 72-83.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1

Types and Styles of Residential Cabinets

LESSON OBJECTIVE:

To research all the various types and styles of residential cabinets.

STUDY ASSIGNMENT:

California Workbook, Part 3, Unit E, pp. 85-92.
Cabinet Making (Mill), United Brotherhood of Carpenters and Joiners of America, pp. 46-51.

REFERENCES:

California Workbook, Part 3, Unit E
Cabinet Making (Mill), United Brotherhood of Carpenters and Joiners of America.

IMPORTANT STUDY FACTORS:

Encourage class discussion of all pertinent points.

WORK ASSIGNMENT:

Answer on scratch paper checkup questions in California Workbook, Part 3, pp. 87-92.
Answer questions on scratch paper in California Testbook, Part 3, pp. 43-46.

INTRODUCTION TO NEXT LESSON:

Cabinet Making (Mill), United Brotherhood of Carpenters and Joiners of America pp. 39-46.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 1

Residential Cabinets

LESSON OBJECTIVE:

To study residential cabinets in more depth individually.

STUDY ASSIGNMENT:

Carpenters and Joiners of America Unit VIII, pp. 39-46.

REFERENCES:

Carpenters and Joiners of America, Unit VIII

WORK ASSIGNMENT:

Answer questions on scratch paper from Carpenters and Joiners of America, pp. 39-46. Study and complete Lesson 88, Unit G, pp. 09.02.33.01 and 33.02.

INTRODUCTION TO NEXT LESSON:

Test and review.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 2

Millwork Operations, Miscellaneous Cabinets (Medicine, Linen, and Wardrobe)

LESSON OBJECTIVE:

To provide the apprentice with information so that he may better understand the requirements for billing, cutting, machining and assembling miscellaneous types of cabinets.

STUDY ASSIGNMENT:

Architectural Woodwork Design Boo, pp. 114-134
Read complete Information Sheet for this Lesson

REFERENCES:

Architectural Woodwork Design Book #505, Curtis Co., Inc.
Information Sheet for this Lesson

IMPORTANT STUDY FACTORS:

Become familiar with the differnet types of doors on medicine cabinets. Pay particular attention to the types of doors and drawers used on wardrobes and linen cabinets.

WORK ASSIGNMENT:

1. Most medicine cabinets have ________________ shelves.
2. As a rule ______________ cabinets are built-in.
3. Most wardrobes have ________________ doors.
4. Some of the wardrobes have two ___________________ at the bottom.
5. All wardrobes should have a __________________ above the hanger rod.
6. Make a sketch of each type of medicine cabinet, linen cabinet, and wardrobe.
7. Lay each one out on a rod.
9. Make a cutting bill of each.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 2

Millwork Operations -- Miscellaneous Cabinets (medicine, linen and wardrobe)

Medicine cabinets

There are two common types of medicine cabinets, the built-in and exposed. The built-in has the same depth as the thickness of the wall into which it is recessed. The shelves should be movable, set on either bracket or rests so that the heighth of the shelves may be altered. The door of both types of medicine cabinets is usually covered with a full-size mirror mounted on a piece of plywood.

The exposed type of medicine cabinet has the same type of interior construction as a built-in type. It is mounted on the wall and its exterior construction should be in harmony with the interior trim of the bathroom. Its exterior surface should be such that it could be finished to match the finish in the room.

Linen closets

Linen cabinets are usually built in hallways, bathrooms or bedrooms. The most practical type of linen cabinet has a combination of shelves and drawers either or both of which may be covered by doors. A common type consists of a series of shelves on the upper half covered by hinged doors and a series of drawers on the bottom half. The depth of the linen cabinet is usually determined by the construction of the house at the location of the linen closet, but should be of sufficient depth and width to amply care for ordinary household linens. The trim on linen closets should match the door and window casings of the room, the top of it should line up horizontally with the door trim.

Wardrobe cabinets

Wardrobe cabinets are constructed in many sizes, determined largely by the house plan, with the average size being approximately five feet wide, two feet deep and interior door heighth. A sturdy hanger rod should be installed, centered approximately between the door and the back of the cabinet so there will be sufficient space for garments to hang with the door closed. A shelf should be placed approximately (not less than) two inches above the hanger rod. Some wardrobe cabinets are equipped with drawers at the bottom, but should not be built up too high to interfere with the hanging of full length garments. All fixed shelves and drawer slides should have the sides dadoed to receive shelves and drawers. Sliding doors are preferable for wardrobe cabinets.

Before making a cutting bill for any cabinet, first layout on a layout rod all the lengths and widths of the material required, being sure to use the same rod during the machining process. When materials are ready for assembly all joints should be glued and mailed before installation.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 3

Final Test (or Alternate) U.B.C. Carpentry, Unit VIII, Cabinetmaking (Mill)

LESSON OBJECTIVE:

To test the apprentice on what he knows

STUDY ASSIGNMENT:

REFERENCES:

Carpenters and Joiners of America
Unit VIII, Cabinetmaking (Mill)

IMPORTANT STUDY FACTORS:

Instructor will use those tests that are relevant to his instructional situation

WORK ASSIGNMENT:

Number and pass out final tests for Carpentry Unit VIII. List students' names by test number. Allow 2 hours for completion. Have students exchange tests and correct. Use either final test or alternate final test.

INTRODUCTION TO NEXT LESSON:

FINAL TEST

(Note: This test is available in printed pamphlet form at U.B. of C.)

The following statements are either true or false. If a statement appears true to you, indicate your opinion by placing a plus sign (+) in the space provided. If the statement appears false, indicate your opinion by placing a zero (0) in the space provided.

_______ 1. "Slab door" and "flush door" are interchangeable terms used to designate the same type of cabinet door.

_______ 2. The depth of a shelf dado should be one-half the thickness of a 3/4" end member.

_______ 3. The type of hinge that should be used on lipped C-C doors is called a "butterfly" hinge.

_______ 4. Bath pullmans (wash basins) are usually installed at a lower height than kitchen sink cabinets.

_______ 5. The width of a tenon is determined by the width of the stile into which it members.

_______ 6. In standard cabinet construction, a blind mortise should extend half-way through the rail.

_______ 7. When laying out cabinets, the standing and running trim are generally not considered.

_______ 8. In standard construction, the cabinet door and sash should finish at least 3/4" in thickness.

_______ 9. A mullion on which lipped doors are hung must exceed 1 1/2" in width.

______ 10. A buttress is a projection against which a door or sash bumps.

______ 11. Stub tenon joints could be used in an open frame carriage.

______ 12. Drawer sides should join drawer fronts with a tongued-lap or dovetail joint.

______ 13. It is not necessary to use more than two off-set hinges for each base cabinet door.

______ 14. Slash or flat grain Douglas Fir is usually satisfactory for interior trim.

______ 15. The length of a tenon is determined by the width of the rail.

______ 16. When a pair of cabinet doors are to be rabbeted, the left-hand door should open first.

UNIT I - LESSON 3

Final Test (cont'd.)

_______17. The clothes rod in a wardrobe cabinet should be 60" or more from the wardrobe floor.

_______18. Cabinets should have open ends when they fit against plaster walls.

_______19. When a center guide is used on a drawer, and there is no open frame carriage, the guide supports the back of the drawer.

_______20. All built-in refrigerator cases should have lipped front doors.

_______21. Stile and rail units should finish 1 1/8" in thickness.

_______22. Where there is no dividing face frame between drawers, side support guides channeled into the drawer sides should be used.

_______23. Drawer bottoms are usually 1/4" in thickness.

_______24. An upper wall kitchen cupboard should be at least 15" above the sink cabinet.

_______25. "Anchored-floating" construction is not recommended for counter tops and drain boards.

_______26. Rough tops for sink cabinets are required to be of solid construction.

_______27. A vertical allowance of 5'-6" is adequate for most refrigerators.

_______28. In standard construction, the drawer bottom is housed into the drawer back.

_______29. The standard depth for a kitchen sink cabinet is 22".

_______30. Ten inches is a proper width for outside porch step treads.

_______31. The head blind stop should be mitered at the upper corners.

_______32. The laminated type cutting boards should finish not less than 3/4" thick.

_______33. The stock size for a single overhead door is 6'-8" x 7'-0".

_______34. The material for a lipped slab door 3/4" thick should be cut 3/4" wider than the opening size.

_______35. A threshold is usually pitched at eleven degrees.

UNIT I - LESSON 3

Final Test (cont'd.)

_______36. When ordering a door, the dimensions are given as thickness by width by height.

_______37. The hinge side of a casement sash should be beveled.

_______38. Basically, a louver is an exterior frame filled with a series of horizontal slats, pitched to exclude water.

_______39. "Rolled-in" construction for screen wire is an approved method.

_______40. The minimum thickness of window screen stiles and rails is 1 1/8".

_______41. The head jamb parting strip is put into a double-hung window frame before the side jamb parting strips are installed.

_______42. The sill pan is that area upon which the sill rests.

_______43. A mullion is an interior horizontal frame member.

_______44. When plaster or stucco is to be used for wall covering, the underside of a window sill should be shaped to provide a plaster or stucco look.

_______45. Radius jambs for shaped head frames should be built up in width with segment strips.

_______46. Normally, the stiles and rails of a face frame are the same in width.

_______47. It is not necessary that the bottom of a lipped drawer be lipped.

_______48. Cabinet partitions should dado into the cabinet bottom.

_______49. The terms "gain joint" and "stopped dado" are interchangeable.

_______50. A cabinet story pole is actually a full-sized layout of a cabinet on a piece of wood.

_______51. A stile is the vertical exterior member of a door, sash, or frame.

_______52. Wall board is recommended for cabinet and casework backs.

_______53. When laying out a door frame, the size is determined from the rough opening.

_______54. Thin veneers glue up more securely than thick veneers.

_______55. Weight cutouts in the side jambs of a window frame should always be removable.

UNIT I - LESSON 3

Final Test (cont'd.)

______56. All material for sills and other exterior frame members should be heartwood.

______57. The length of a head jamb for an exterior 1 3/4" rabbeted door frame is equal to the width of the door plus the thickness of one stile of the frame.

______58. All sill and yoke joints should be carefully leaded with white lead paste before assembly.

______59. The minimum thickness of a door stop is 3/8".

______60. The drip cap on a window frame fastens just underneath the sill.

One or more words have been omitted from the following statements. Write in the correct word or words required to complete the sentence, in the space provided.

61. Blind stops for frames with patented balances are usually _______ to _________ thick.

62. Sills for doors should be set at an angle of _________ degrees.

63. Pulley stiles for exterior openings should be ___________ to receive the sill.

64. If side and head jambs have a solid moulding edge profile, they should have ____________________ joints.

65. When drip moulds are employed, the side casing ___________ into the head casing.

66. Reasonable matching as to grain and color must be maintained when exterior finish is _________________ or edge glued.

67. Sash is sometimes described in terms of ______________.

68. If the top rail of the sash does not join the stiles and form a ninety degree angle, it is known as an ________________ head.

69. Face veneers for door stiles and rails should not be more than _________________ of an inch in thickness before sanding.

70. In cross banded work, the ________________ veneer is simply a surface finish.

71. Doors which show no stiles or rails are ______________ doors.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 3

Final Test (cont'd.)

72. All machine run exterior trim should finish ____________ and ____________.

73. A "C-C" door may be either a ________________ door or a paneled door.

74. When dowels are used in stile and rail door construction, the dowels should extend into the stile and rail about ____________ the width of the ________________.

75. The moisture content of interior jamb stock should not be more than ____________________ or ____________________ per cent.

76. Interior finish can be defined as all __________________ and __________ ______________ interior trim members.

77. Panels in S&R doors should be free ________________.

78. A common method of joining moulded jamb and head casing is with a ________________ and ____________________ joint.

79. Butt hinges for flush doors must be large enough to ______________ the door casing.

80. Rabbeted jamb stock should be at least ________________ thick.

81. A tenon is ____________________ made the full width of a rail.

82. The length of a given tenon is determined by the width of a given ____________________.

83. When dowels are used in S&R doors, they should extend into the rail about ________________ of the stile's width.

84. Exterior doors have a minimum standard thickness of ____________ inches.

85. In standard construction, the drawer bottom is ______________ housed into the back.

86. The terms "________________ dado" and "____________________ joint" mean the same thing.

87. A ________________ joint should be used where base shoe joins on an exterior angle.

88. The standard pitch of a window sill is ________________ than 15 degrees.

UNIT I - LESSON 3

Final Test (cont'd.)

89. The standard height of a communicating door is ____________.

90. The ________________ is that part of the jamb edge that shows after the casing has been installed.

91. In mill-built cabinets, shelves are usually joined to ends with a ______ ________________ joint.

92. If a cabinet's stiles and rails are the same width, it is said to be ______________________.

93. Interior trim members applied to plaster surfaces shall be backed out if their width and thickness is greater than ____________ x ____________.

94. The knee space in a dressing table should be _____________ inches in height.

95. __________________ and ____________________ should determine the method by which hardwood trim is sorted.

96. A flight of steps is an uninterrupted series of steps between ____________________ or landings.

97. Step layout lines indicate the _____________ of the tread and the _________________ of the riser.

98. Two stringers are required to be _______________ for a closed stair.

99. A circular stair is classified as a ________________ stair.

100. A _____________________ is the angle formed by a staircase.

The words in Column I below are related to the definitions in Column II. Show to which definition in Column II each word in Column I belongs by placing the numbers before each definition in front of the correct word.

Column I	Column II
( ) solid door	101. The whole set of stairs including the side support members.
( ) panel curb	102. Stairs with an open space between flights and newels at the angle of the stair panel curb.
( ) birch	103. A closed stringer ornamented with panels.

UNIT I - LESSON 3

Final Test (cont'd.)

- ( ) Douglas Fir
- ( ) cross rails
- ( ) open-newel stairs
- ( ) soffit
- ( ) bow face step
- ( ) staved column
- ( ) louver
- ( ) rake
- ( ) miter
- ( ) louver doors
- ( ) interior trim
- ( ) flush door
- ( ) staircase
- ( ) exterior trim
- ( ) lock rail
- ( ) chamfer
- ( ) Philippine hardwood

104. S&R made of solid lumber.

105. No stiles or rails show on its faces.

106. S&R frames both horizontal slats and flat panels.

107. Wider than the stiles or top rails of a door.

108. Interior horizontal rails.

109. All plain, unscrolled S4S and molded trim required detached and not structural in nature.

110. All standing and running interior trim.

111. Grain will vary from nearly straight to a pronounced irregular pattern.

112. Does not indicate a true classification of any physical properties.

113. Strong, medium hard, resilient. Varies from yellow to light red in color.

114. The angle of inclination from perpendicular.

115. The underside of a cornice (the plancier).

116. Formed by cutting away the angle formed by two faces of a board.

117. Formed by edge gluing narrow strips of wood.

118. A slatted opening for admission of air.

119. A swelled step, generally with both ends finished in the shape of a part circle.

120. To form a joint by matching pieces in a line bisecting the angle of joining.

UNIT I - LESSON 3

Final Test (cont'd.)

Each of the following items contains several statements, only one of which is correct. Underscore the correct answer and place the corresponding number in the parentheses at the left of the page.

( ) 121. An erroneous formula for the calculation of unit rise and run is: (1) "T" plus "2R" equals 24; (2) "2T" plus "R" equals 24; (3) "T" plus "R" equals 17; (4) "T" times "R" = 70-74.

( ) 122. In the erection of mill-built stairs, the first operation is to: (1) erect the framework for the landing; (2) locate the stringer position on the wall; (3) establish key layout points at the stair location; (4) properly assemble first flight and set in place.

( ) 123. The inclination of a stair is called the: (1 degree; (2) angle; (3) pitch; (4) newel.

( ) 124. The front edge of a tread rests on the: (1) stretcher; (2) string piece; (3) baluster; (4) riser.

( ) 125. The mathematical length of a stair is equal to: (1) the square of the product of the rise and run; (2) the square of the rise times the run; (3) the total rise times the total run; (4) the sum of the total rise plus the total run.

( ) 126. Which of the following joints is formed wholly on the edge of a board: (1) dado; (2) plough; (3) rabbet; (4) groove.

( ) 127. Which of the following trim members could run vertically? (1) back band; (2) dado mould; (3) head casing; (4) apron.

( ) 128. Normally, the standard height of a kitchen sink cabinet is (1) 34"; (2) 28"; (3) 36"; (4) 32".

( ) 129. If plancier stock were selling at $145.50 per M board feet, the cost of 210 lineal feet of 1' x 10" stock would be: (1) $18.75; (2) $14.55; (3) $25.38; (4) $16.12.

( ) 130. When figuring the amount of felt paper needed to cover a side wall, the per cent that should be added for waste and normal lapping is (1) 10%; (2) 15%; (3) 8%; (4) 12%.

UNIT I - LESSON 3

ALTERNATE FINAL TEST

The following statements are either true or false. If a statement appears true to you, indicate your opinion by placing a plus sign (+) in the space provided. If the statement appears false, indicate your opinion by placing a zero (0) in the space provided.

_____ 1. Pairs of C-C doors should be rabbeted.

_____ 2. A semi-concealed or offset hinge is always used on a lipped door.

_____ 3. When building frames for any given building, the pitch of the window and exterior door sills should be the same.

_____ 4. Inside linings and back linings of box frames may be made of sound common grade lumber.

_____ 5. When wood swells due to moisture and then dries to its original moisture content, it usually returns to its original size and shape.

_____ 6. When the edges of two boards are shaped so that one fits into the other, they are said to be matched.

_____ 7. "C-C" is the designation used to distinguish between paneled and flush cabinet doors.

_____ 8. Where transom bars are used in door or window frames, the side jambs should dado into the transom bar.

_____ 9. A D.H. window is defined as two sash that slide vertically past each other to fill an opening.

_____ 10. Generally, all stiles and rails of a full bound sash are the same in width.

_____ 11. A scribed-in installation is better construction than a moulded-in installation.

_____ 12. When fitting spring balances, the lower sash is fitted first.

_____ 13. The casement sash is usually hinged at the top.

_____ 14. The spring guide is secured to the sash on the same side as the cable hanger.

_____ 15. The check rail is the bottom rail of the lower sash.

_____ 16. Usually, only the top sash of a special double-hung window has horns.

UNIT I - LESSON 3

ALTERNATE FINAL TEST (cont'd.)

_____17. The parting beads should be securely nailed into the window frame.

_____18. The bottom rail of a sash should be beveled exactly like the top of the sash frame sill.

_____19. The stiles of a face frame are usually cut between the rails.

_____20. Blind nailing cannot be done in a dado joint.

_____21. A box window frame is a frame made to use sash weights and cords.

_____22. The upper sash of a D. H. window always runs between the parting bead and the blind stop.

_____23. When a swing-out casement sash is used, its length is determined from the outside edge of the side jamb.

_____24. The side play for the front of a flush drawer should normally be 1/8" on each side.

_____25. The weight cutouts in a D. H. window frame should be secured into the jamb by means of screws.

_____26. The size of screen wire is determined by the diameter of the wire used.

_____27. Stock window sill width for a 2 x 4 stud wall, stucco and plaster finish, is 7 1/2".

_____28. Normally, the sill of a louver is pitched the same as a window sill.

_____29. The center of a patented sash balance should be located at the center of the meeting point of the check rails of the sash.

_____30. The dimensions of a blind stop are 3/8" x 3/4".

_____31. The depth of the dado for a shelf would be 3/8" if the end member were 3/4" thick.

_____32. 3/8" offset hinges are used for 3/4" lipped C-C doors.

_____33. The height of a bath pullman is normally more than the kitchen sink cabinets.

_____34. The width of a tenon is not determined by the width of the stile into which it members.

ALTERNATE FINAL TEST (cont'd.)

_____35. In standard cabinet construction, the depth of a blind mortise should not extend one-half way through the rail.

_____36. Any standing and running trim must be considered when laying out cabinets.

_____37. In standard construction, the cabinet doors should finish to a minimum of 1" in thickness.

_____38. One and one-half inch is generally the width of the mullion on which lipped doors are hung.

_____39. The standard base cabinet door does not require more than two offset hinges.

_____40. Flat grain Douglas Fir is commonly used and is usually satisfactory for interior trim.

_____41. On mortised and tenoned C-C doors, the widths of the top and bottom rails generally determine the length of the tenon that can be used.

_____42. When pairs of C-C doors are rabbeted, the right hand door should open first.

_____43. The average height of a wardrobe cabinet clothe rod is 4'-6" above the bottom of the wardrobe.

_____44. Generally, all cabinets fitting against plaster should have closed ends.

_____45. Side support guides, let into the drawer side, are used where there is no dividing face frame member between drawers.

_____46. One-quarter inch stock is generally used for drawer bottoms.

_____47. The minimum height that an upper kitchen wall cabinet should be above the sink cabinet is 15".

_____48. Floating construction is not recommended for drain boards.

_____49. The grain of all door panels should be vertical in direction.

_____50. Only a "sash door" has stiles and rails which frame both glass and panels.

_____51. Windows and sash are described on the basis of their construction.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 3

ALTERNATE FINAL TEST (cont'd.)

_____ 52. A combination door is a door whose stiles and rails frame both horizontal slats and panels.

_____ 53. Casement sash should be 1 1/8" in thickness when finished.

_____ 54. Blind tenons should be at least 1 1/2" in length.

_____ 55. Two 3/8" dowels should be used in all sash 1 3/8" thick or over if the dowel assembly is used.

_____ 56. In standard construction, the back of a drawer rests on top of the drawer bottom.

_____ 57. Although the terms surbase and picture mold cannot be used interchangeably, they are generally in the same approximate position.

_____ 58. Butt joints are used to join side and head blind stops.

_____ 59. The horizontal members that divide a sash into two or more lights are commonly known as mullions.

_____ 60. The net minimum thickness of a laminated type cutting board should be 3/4".

One or more words have been omitted from the following statements. Write in the correct word or words required to complete the sentence, in the space provided.

61. Blind stops for frames with patented balances are usually __________ wide.

62. Sills for window sash frames should be set at an angle of __________ degrees from horizontal.

63. Sill stock should be at least ______________ inch thick.

64. Material used for rabbeted jamb stock should not be less than ______________ thick.

65. Normally, all exterior finish materials should be well ______________.

66. The two exterior vertical members which frame the glass in a sash are ________________.

67. The narrow dividing members which serve as cut-ups for glass openings are called ____________________ or ____________________________.

ALTERNATE FINAL TEST (cont'd.)

68. Face veneers for door stiles and rails should not be less than ______________ of an inch in thickness before sanding.

69. In door construction, all pieced-up ______________ should be re-dried after gluing.

70. Thin face veneers ____________________ glued more securely than thick veneers.

71. Flush doors should be of ____________ up and _________________ construction.

72. The three methods used to glaze sash are called _________________ puttying, ________________ puttying, and _______________.

73. When mortise and tenon joints are used in door construction, the length of the tenon is approximately ______________ of the ____________ width.

74. Hollow core doors should be at least __________ ply or more in thickness.

75. When tops and drain boards for sink cabinets are required as one member item, they should finish ______________ net thick or thicker.

76. All casing should be neatly ______________ at corner assemblies.

77. Jamb assemblies are of two main types _______________________ and ____________________.

78. S&R door joint construction is generally ______________ mortised and tenoned or ___________________ type.

79. Interior jamb stock should be at least ________________ thick.

80. When the stops and jambs of a door are milled as a unit, it is known as a ________________ jamb.

81. The jig used to hold a door while fitting is called a _____________.

82. When dowels are used in S&R doors, they should extend into the stile about _____________________ of the width of the stile.

83. All moulding joints in inside corners should be ________________.

84. _______________________ is the minimum allowance that should be used between the parting strip and the interior stop for a 1 3/8" sash.

UNIT I - LESSON 3

ALTERNATE FINAL TEST (cont'd.)

85. ________________ are used when it is necessary to divide a frame into two or more vertical openings.

86. Drawer sides are ____________________ out to receive the drawer bottom.

87. The rabbet on the end of a lipped drawer front would be ______________ of an inch if one-half inch drawer sides were used.

88. Generally, hardwood trim members should be sorted for ________________ and ___________________.

89. A special ________________ is required for a swing-in casement sash.

90. ______________________ details are necessary for cabinets even though the floor plan is accurately drawn.

91. Cabinet backs may be either T&G or ____________________.

92. Exposed corners for cabinet and case work should employ a _____________ joint.

93. When interior jambs have a solid moulded edge profile, the head and side jambs should be joined together with a _________________ joint.

94. The knee space in a desk should be ____________________ inches in height.

95. A flier is one step in a ____________________ of parallel steps.

96. An intermediate landing is considered as a step when calculating __________________________ rise.

97. A cockel stair is ___________________ in shape.

98. If three winders form a quarter space turn, the angle formed by each riser is __________________ degrees.

99. A half space landing creates a turn of _________________ degrees in the stairs.

100. Handrails for _________________ stairs are band sawn and shaped to size.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 3

Tacoma Millmen's Test
Seattle Edison Millmen's Test

LESSON OBJECTIVE:

To test the apprentice on what he knows

STUDY ASSIGNMENT:

REFERENCES:

Carpenters and Joiners of America, Unit VIII
Cabinetmaking (Mill)

IMPORTANT STUDY FACTORS:

Instructor will use those tests that are relevant to his instructional situation.

WORK ASSIGNMENT:

Number and pass out tests.

Tacoma Millmen's Test
Seattle Edison Millmen's Test

List students' tests by number so all grading is unbiased.
After students complete tests collect and pass out for grading and review.

INTRODUCTION TO NEXT LESSON:

Examination and Review, Cabinetmaking and Millwork, Part 3

CABINETMAKING AND MILLWORK

UNIT I - LESSON 3

TEST QUESTIONS FOR TACOMA MILLMEN'S APPRENTICESHIP CONTEST

TEST 1

One or more words have been omitted from the following statements. Write the word or words required to complete the sentence in the space provided. There is only one correct answer.

1. Unless otherwise specified, all stationary parts of casework shall be ____________________ inch thick.

2. The term of apprenticeship shall not be less than __________ years.

3. Formica is a trade name for a ____________ ____________ laminate.

4. Next to injury from cutting, the greatest danger in using the circular saw is ____________________.

5. Sills for doors should be set at an angle of ____________ degrees.

The following statements are TRUE or FALSE. Indicate TRUE with a plus sign (+) or FALSE with a zero (0) placed in the space provided.

_______ 1. The size of a bit brace is given according to the diameter of the circle the handle makes in one revolution.

_______ 2. When a log is plain sawed, "slash" or "flat" grain is produced.

_______ 3. The size of screen wire is determined by the diameter of the wire used.

_______ 4. When using contact cement the "skin" cannot be shifted.

_______ 5. The head jamb parting strip is put into a double-hung window frame before the side jamb parting strips are installed.

_______ 6. The minimum thickness of a door stop is 3/8".

_______ 7. Torn wood fibers are nearly always the result of dull cutting edges or too fast a feed rate.

_______ 8. A dog-leg stair is composed of two flights of stairs in one staircase.

_______ 9. The drum sander oscillates in order to minimize wear on the sandpaper.

_______ 10. When a center guide is used on a drawer, and there is no open frame carriage, the guide supports the back of the drawer.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 3

TEST QUESTIONS FOR TACOMA MILLMEN'S APPRENTICESHIP CONTEST

TEST 2

One or more words have been omitted from the following statements. Write the word or words required to complete the sentence in the space provided. There is only one correct answer.

1. Face frames should be doweled or ____________________ construction.
2. High pressure laminates are built up of ____________ ____________.
3. ________________ is the best phenolic resin to use in the manufacture of H.P. laminates.
4. In order to cut a rabbet in one operation on the table saw, the ________________ should be used.
5. When drip molds are employed, the side casing ______________________ into the head casing.

The following statements are TRUE or FALSE. Indicate TRUE with a plus (+) or FALSE with a zero (0) placed in the space provided.

______ 1. Handsaws are filed with a mill saw.

______ 2. Birch, maple, oak and walnut are coniferous woods.

______ 3. The minimum height that an upper kitchen wall cabinet should be above the sink cabinet is 15".

______ 4. With abrasive attachments, the router can logically be used as a sander.

______ 5. A cabinet story pole is actually a full sized layout of a cabinet on a piece of wood.

______ 6. The proper order for the dimensions of a board are width, then length, then thickness.

______ 7. A circular saw blade is jointed to make the teeth the same length.

______ 8. The sum of the tread rise and tread run in an easy flight of stairs should be about 17".

______ 9. The first riser of a stair is wider than the rest by the amount required for the drop below the finish floor.

______ 10. Excessive water causes wood to swell.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 3

TEST QUESTIONS FOR TACOMA MILLMEN'S APPRENTICESHIP CONTEST

TEST 3

1. All moulding joints in inside corners should be ____________________.

2. If a hand saw binds in the cut, the saw usually needs to be ________ ____________________________.

3. Electrostatis treatment is given to sandpaper to make the __________ ____________________________stand on end.

4. A stair having 15 treads has ______________________________risers.

5. The knee space in a dressing table should be ______________________ inches in height.

The following statements are TRUE or FALSE. Indicate TRUE with a plus sign (+) or FALSE with a zero (0) placed in the space provided.

_____1. A "box" nail has greater diameter than a "common" nail.

_____2. A combination square is often used for scribing lines parallel to the edge of a board.

_____3. "Philippine Mahogany" is not a member of the mahogany family.

_____4. The shape of the gullet of a circular saw blade determines its clean cutting qualities.

_____5. The teeth of a band saw blade should extend in front of the side guides about an amount equal to the depth of the teeth.

_____6. The jaws of a handscrew are usually made of wood.

_____7. An average number of pitch pockets in pine has little effect on the strength of the wood.

_____8. 3/8" offset hinges are used for 3/4" lipped C-C doors.

_____9. The majority of drill presses have a range of spindle speeds from 500 r.p.m. to 5,000 r.p.m.

_____10. Radius jambs for shaped head frames should be built up in widths with segment strips.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 3

TEST QUESTIONS FOR TACOMA MILLMEN'S APPRENTICESHIP CONTEST

TEST 4

One or more words have been omitted from the following statements. Write the word or words required to complete the sentence in the space provided. There is only one correct answer.

1. Interior jamb stock should be at least ____________________ thick.

2. The length of a round head screw is measured from the point to the ____________________.

3. The fundamental and basic woodworking machine is the ____________________.

4. According to the apprenticeship standards, apprentices are required to attend a minimum of __________ hours a year of related trade instruction.

5. A ____________________ wire cord is necessary to ground portable equipment.

The following statements are TRUE or FALSE. Indicate TRUE with a plus sign (+) or FALSE with a zero (0) placed in the space provided.

_____ 1. A bull-nosed-lipped-rabbeted door uses loose pin butt hinges.

_____ 2. When a circular saw is placed on the arbor from the left, as the operator stands in the in-feed area, the nut is left-hand threaded.

_____ 3. Generally, all stiles and rails of a full bound sash are the same in width.

_____ 4. The purpose of the throat plate in a band saw table top is to prevent injury to the blade in case of breakage.

_____ 5. "Slab Door" and "Flush Door" are interchangeable terms used to designate the same type of cabinet door.

_____ 6. All material for sills and other exterior frame members should be heartwood.

_____ 7. When a circle 14" in diameter can be band sawn, the saw would be called a fourteen inch band saw.

_____ 8. The outside edge of a newel must align with the face of the face stringer.

_____ 9. The width of a tenon is not determined by the width of the stile into which it members.

_____ 10. When folding a band saw blade, the folds must be uneven in number.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 3

TEST QUESTIONS FOR TACOMA MILLMEN'S APPRENTICESHIP CONTEST

TEST 5

One or more words have been omitted from the following statements. Write the word or words required to complete the sentence in the space provided. There is only one correct answer.

1. A mantel pilaster is a trim member running in a ________________________ direction.

2. An apprentice must normally be between the ages of 17 and ______ when he is indentured.

3. When boards are stored for air seasoning, it is essential that they be ______________________________ while they are being piled.

4. A ____________________ prevents the surface planer from tearing the stock.

5. A molding with a convex quarter circle shaped in its face is called a _________________________ molding.

The following statements are TRUE or FALSE. Indicate TRUE with a plus sign (+) or FALSE with a zero (0) placed in the space provided.

______ 1. The face mark should be turned down when a face frame member is being sawed.

______ 2. When running stock against the collar, it should always be fed with the rotation of the spindle.

______ 3. No variation from the rise and run proportioning rule is permitted.

______ 4. In laying out a balustrade the centers of the newels, balusters, and the railing are all aligned.

______ 5. The center of a patented sash balance is usually located at the meeting point of the check rails.

______ 6. "Butterfly" hinges should be used on lipped C-C doors.

______ 7. The balance of the shaper spindle can be checked by holding the point of a pencil in the tapered hole in the end of the spindle.

______ 8. Winders should be so laid out that the tread is approximately 10 inches wide at the line of travel.

______ 9. The line of travel must be allowed for in all flier layouts.

______ 10. Blind nailing cannot be done in a dadoed joint.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 3

TEST QUESTIONS FOR TACOMA MILLMEN'S APPRENTICESHIP CONTEST

TEST 6

One or more words have been omitted from the following statements. Write the word or words required to complete the sentence in the space provided. There is only one correct answer.

1. The normal allowance for lathe and plaster is ______________ inch.

2. The U. B. of C. and J. of Am. was organized in the year ____________.

3. In sanding paint or pitchy woods ________________ cote paper should be used.

4. Any cutting edge that has been ground must then be _________________ prior to its use.

5. The one dimension of a stair that can never be adjusted is the _______________________.

The following statements are TRUE or FALSE. Indicate TRUE with a plus sign (+) or FALSE with a zero (0) placed in the space provided.

_____1. A swing-in casement cash requires a special stool.

_____2. Changing a board from end to end as well as from face to face insures a regular thickness when surfacing its faces.

_____3. When jointing both ends and edges, the ends should be jointed first.

_____4. There is always one more tread than there are risers in a flight of stairs.

_____5. Ten inches is a proper width for outside porch step treads.

_____6. The side play for a flush drawer should be 1/8" on each side.

_____7. It is quite practical to use a shaper to bevel or miter the edges of a board.

_____8. A stair rod is a reinforcing rod.

_____9. It is logical to joint a circular saw blade while it is on the machine.

_____10. The minimum thickness of window screen stiles and rails is 1-1/8".

CABINETMAKING AND MILLWORK

UNIT I - LESSON 3

TEST QUESTIONS FOR TACOMA MILLMEN'S APPRENTICESHIP CONTEST

TEST 7

One or more words have been omitted from the following statements. Write the word or words required to complete the sentence in the space provided. There is only one correct answer.

1. When the plans and specifications are not in agreement, the ____________________ take precedence.
2. The working life of plastic resin glue at 70 degrees temperature is about ____________________ hours.
3. "Blind", "pinned", "haunched", "slip", "barefaced", and "wedged" are names for types of ____________________ joints.
4. When there is danger of abrasive paper clogging ____________________ paper is used.
5. The decimal equivalent of the fraction 3/16 is ____________________.

The following statements are TRUE or FALSE. Indicate TRUE with a plus sign (+) or FALSE with a zero (0) placed in the space provided.

______1. Elevations of cabinets are not necessary in a house plan if the floor plan is accurately drawn.

______2. The size of a planer is given as the thickness of the thickest stock it can accept.

______3. A closed stringer is usually cut and mitered.

______4. A stair with returned risers uses a cut-and-mitered stringer.

______5. "Rolled-in" construction for screen wire is an approved method.

______6. In a lipped drawer, the bottom of the front need not be lipped.

______7. The primary purpose of the milled glue joint is to speed up assembly of glued-up units.

______8. The thickness of a finish floor is a consideration in calculating total rise.

______9. A basket guard can be used when dadoing.

______10. The salvage of a lock is the cover for the key pin.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 3

SEATTLE EDISON TECHNICAL SCHOOLS MILLMEN'S TEST

The following statements are either true or false. If a statement appears true to you, indicate your opinion by placing a T (T is true) in the space provided. If the statement appears false, you are to indicate that opinion by placing an F (F for false) in the space provided.

_____1. Slab door and flush door are interchangeable terms used to designate the same type of cabinet door.

_____2. The width of a tenon is determined by the width of the stile into which it members.

_____3. In standard construction, the cabinet door and sash should finish at least 3/4 inches thickness.

_____4. A Mullian on which lipped doors are hung must exceed 1' 2" in width.

_____5. Drawer sides should join drawer fronts with a tongued-lap or dovetail joint.

_____6. It is not necessary to use more than two off-set hinges for each base cabinet door.

_____7. Slash or flat grain Douglas Fir is usually satisfactory for interior trim.

_____8. The clothes rod in a wardrobe cabinet should be 60" or more from the wardrobe floor.

_____9. Cabinets should have open ends when they fit against plaster walls.

_____10. Where there is no dividing face frame between drawers, side support guides channeled into the drawer sides should be used.

_____11. Drawer bottoms are usually 1/4" thick.

_____12. An upper wall kitchen cupboard should be at least 15" above the sink cabinet.

_____13. A vertical allowance of 5'-06" is adequate for most refrigerators.

_____14. In standard construction, the drawer bottom is housed into the drawer back.

_____15. The standard depth for a kitchen sink cabinet is 22".

_____16. Ten inches is a proper width for outside porch step treads.

_____17. The laminated type cutting boards should finish not less than 3/4" thick.

_____18. Basically, a louver is an exterior frame felled with a series of horizontal slots, pitched to exclude water.

SEATTLE EDISON TECHNICAL SCHOOLS MILLMEN'S TEST (cont'd.)

______ 19. Normally, the stiles and rails of a face frame are the same in width.

______ 20. It is not necessary that the bottom of a lipped drawer be lipped.

______ 21. The terms "Cain-Joint" and "Stopped Dado" are interchangeable.

______ 22. A cabinet "Story Pole" is actually a full-sized layout of a cabinet on a piece of wood.

______ 23. Thin veneers glue up more securely than thick veneers.

______ 24. Weight cut outs in the side jambs of a window frame should be removable.

______ 25. The minimum thickness of a door stop is 3/8".

______ 26. When wood swells due to moisture and then dries to its original moisture content, it usually returns to its original size and shape.

______ 27. When the edges of two boards are shaped so that one fits into the other, they are said to be matched.

______ 28. A D. H. window is defined as two sash that slide vertically past each other to fill an opening.

______ 29. A "scribed-in" installation is better construction than a "molded-in" installation.

______ 30. The check rail is the bottom rail of the lower sash.

______ 31. The parting heads should be securely nailed into the window frame.

______ 32. Blind nailing cannot be done in a dado joint.

______ 33. The average R.P.M. of a 10" circular saw should be 1780.

______ 34. It's logical to joint a circular saw blade while it is on the machine.

______ 35. Hollow ground saw blades have no set in the teeth.

______ 36. A basket guard can be used when dadoing.

______ 37. A splitter should be used to prevent kick-backs when ploughing grooves.

______ 38. When a bevel of less than 45° is to be cut on the circular saw, the saw must be tilted to the complement of the angle desired.

UNIT I - LESSON 3

SEATTLE EDISON TECHNICAL SCHOOLS MILLMEN'S TEST (cont'd.)

______39. The slots that are milled in a saw table-top are always at right angles to the front of the table.

______40. The upper wheel of a bandsaw is the driver.

______41. A bandsaw blade should travel about 12,000 feet per minute.

______42. Machine planing leaves a series of small ridges and hollows on the surface of the wood.

______43. Torn wood fibers are nearly always the result of dull cutting edges or too fast a feed rate.

______44. The infeed table of a jointer is so mounted that it can never be tilted, as it rotates to the outfeed table.

______45. The size of a planer is given as the thickness of the thickest stock it can accept.

______46. In all rotary cutting tools, the cutter head must rotate against the feed direction of the stock.

______47. Only one operation, planing to thickness can be performed on the thickness planer.

______48. When running stock against the collar, it should always be fed with the rotation of the spindle.

______49. It is quite practical to use a shaper to bevel or miter the edges of a board.

______50. To be safe, it is better to over-lubricate ball bearings.

______51. Artificial abrasives are made in electric furnaces.

______52. To avoid sanding marks on hardwoods, sanding should be done with a light rotary motion.

______53. All saw mandrels are threaded clockwise.

______54. The modern radial saw is designed for crosscutting only.

______55. The bandsaw is one of the most dangerous woodworking machines to operate.

______56. If the outfeed table of a jointer is too low, the knives will dig in the last inch or so of the stock.

UNIT I - LESSON 3

SEATTLE EDISON TECHNICAL SCHOOLS MILLMEN'S TEST (cont'd.)

______57. By using a push block, one can end plane stock less than four inches long on the average jointer.

______58. The cutter should always be operating over the work for free-hand shaping.

______59. A tilting arbor saw is accepted as being more versatile than a tilting table saw.

______60. For the purpose of flexibility, the rip fence of a saw table is sometimes made so that it can be tilted.

One word or more has been omitted from the following statements. Write in the word or words to complete the sentence, in the space provided. There is only one correct answer.

61. A ____________ ____________ prevents the surface planers from tearing stock.

62. Next to injury from cutting, the greatest danger in using the circular saw is ________________ ________________.

63. The circular saw blade should project about ________________ above the stock.

64. In order to cut a rabbit in one operation on the table saw, the ____________________ ________________ should be used.

65. In a direct drive machine, the cutter head of a jointer usually revolves at ____________________ R.P.M.

66. Probably, the most dangerous machine in the shop is the ____________.

67. The size of a bandsaw is calculated by the ____________ ____________.

68. "Veining" is an operation generally performed with the ____________.

69. To change the thickness of a tenon, the ____________ ______________ is adjusted on the tenoner.

70. A bull's eye or a blue spot, on a saw blade, is caused by ______ _______.

71. The jointer, planer, moulder, matcher, and sticker have the ____________ cutterhead in common.

72. A shaper spindle usually revolves at about ________________ R.P.M.

SEATTLE EDISON TECHNICAL SCHOOLS MILLMEN'S TEST (cont'd)

73. Reasonable matching as to grain and color must be maintained when exterior finish is ____________________ or edge glued.

74. Exterior doors have a minimum standard thickness of ____________ inches.

75. Two stringers are required to be ____________ for a closed stair.

76. Drawer sides are ________________ or ________________ out to receive the drawer bottom.

77. All moulding joints in inside corners should be ____________________.

78. A ____________________ joint should be used where base shoe joins on an exterior angle.

79. The fundamental and basic woodworking machine is the _________ ______ ____________________.

80. The slot left by a saw blade is called a ____________________.

Each of the following items contain several statements, only one of which is correct. Underscore the correct response and place the corresponding number in the parentheses at the left of the page.

( ) 81. In the erection of mill built stairs, the first operation is to: (1) erect the framework for the landing; (2) locate the stringer position on the wall; (3) establish key layout points at the stair location; (4) properly assemble the first flight and set in place.

( ) 82. The inclination of a stair is called the: (1) degree; (2) angle; (3) pitch; (4) newel.

( ) 83. The front edge of a tread rests on the : (1) stretcher; (2) string piece; (3) baluster; (4) riser.

( ) 84. Which of the following joints is formed wholly on the edge of a board: (1) dado; (2) plough; (3) rebbet; (4) groove.

( ) 85. Generally, the standard height of a kitchen sink is: (1) 34"; (2) 28"; (3) 36"; (4) 32".

( ) 86. If plancier stock were selling at $145.50 per M board feet, the cost of 210 lineal feet of 1" x 10" stock would be: (1) $18.75; (2) $14.55; (3) $25.38; (4) $15.12.

UNIT I - LESSON 3

SEATTLE EDISON TECHNICAL SCHOOLS MILLMEN'S TEST (cont'd.)

( ) 87. The ball bearing collars are used on a shaper to: (1) prevent undue side thrust on the spindle; (2) permit the spindle to turn at a high rate of speed; (3) prevent the machine from overheating; (4) prevent burning the edge of the pattern.

( ) 88. The swing saw is the most suitable for: (1) rough cutting to length; (2) cutting plywood to size; (3) trimming glue-ups to size; (4) trim sawing.

( ) 89. The belt driven swing cutoff saw is powered by a motor located on the: (1) saw arbor; (2) yoke above the saw; (3) saw table; (4) floor behind the saw.

( ) 90. To edge join 3/4" stock to a precise width of nine inches, the best machine of those found in the average cabinet shop would be the: (1) jointer; (2) planer; (3) hollow ground circular saw; (4) shaper.

( ) 91. To bore a smooth bottomed hole, 1/2" in diameter, the best bit to use would be a: (1) Foerstner; (2) multiple spur bit; (3) auger bit; (4) ship auger.

( ) 92. Strain tension on a band saw blade is regulated according to: (1) length of the blade; (2) width of the blade; (3) cutting speed; (4) size of the blade teeth.

( ) 93. Kick backs are most likely to occur on the shaper when: (1) holddowns are not employed; (2) stock is fed against the rotation of the spindle; (3) stock is fed with the rotation of the spindle; (4) stock is fed too fast.

( ) 94. In order to cut a dado 9/16" wide, the minimum number of units of the dado head that can be used is: (1) three; (2) four; (3) five; (4) six.

( ) 95. Jointer knives should be set to cut: (1) level with the infeed table; (2) above the out-feed table; (3) below the out-feed table; (4) level with the out-feed table.

( ) 96. The size of a band saw is indicated by the: (1) diameter of the wheels; (2) length of the blade; (3) size of the stock that will pass between the blade and the "goose neck"; (4) width of the blade.

SEATTLE EDISON TECHNICAL SCHOOLS MILLMEN'S TEST (cont'd.)

( ) 97. Excess material can be removed quickest by sanding: (1) Across the grain; (2) with the grain; (3) diagonally across the grain; (4) in a rotary motion.

( ) 98. The rubber covered pulleys on a portable sander function to: (1) prevent the drums from sanding hollows in the stock; (2) increase traction on the sanding belt; (3) provide a strain tension on the sanding belt; (4) form a cushion to facilitate sanding irregular surfaces.

( ) 99. The circular saw can be used to make all of the following joints. Which set-up is the simplest? (1) spline miter; (2) compound miter; (3) dado; (4) box joint.

( ) 100. In order to dado a board, it is necessary to remove the: (1) splitter; (2) throat insert; (3) kerping; (4) ripping fence.

CABINETMAKING AND MILLWORK

UNIT I - LESSON 3

SEATTLE EDISON TECHNICAL SCHOOLS MILLMEN'S TEST (cont'd.)

TEST KEY

1. F
2. F
3. T
4. F
5. T
6. T
7. F
8. T
9. F
10. F
11. T
12. T
13. T
14. F
15. F
16. T
17. T
18. T
19. F
20. T
21. F
22. T
23. T
24. T
25. T
26. F
27. T
28. T
29. T
30. F
31. F
32. F
33. F
34. T
35. T
36. F
37. F
38. F
39. T
40. F
41. F
42. T
43. T
44. F
45. F
46. T
47. T
48. F
49. F
50. F
51. T
52. F
53. F
54. F
55. F
56. T
57. F
58. F
59. T
60. T
61. Chip breaker
62. Kickbacks
63. 1/8" to 1/2"
64. Dado head
65. 3400 RPM
66. Shaper
67. Dia. of wheels
68. Router
69. Top Head
70. Overheating
71. Rotary
72. 10,000
73. End matched
74. 1-3/8"
75. Notched
76. Dadoed Plowed
77. Coped
78. Miter
79. Table Saw
80. Kerf
81. 3
82. 3
83. 4
84. 3
85. 3
86. 3
87. 4
88. 1
89. 2
90. 1
91. 1
92. 2
93. 1&3
94. 1&2
95. 4
96. 1
97. 1
98. 2
99. 4
100. 1

CABINETMAKING AND MILLWORK

UNIT I - LESSON 3

Examination -- Cabinetmaking and Millwork, Part 3

LESSON OBJECTIVE:

To test the apprentice on what he has retained from Part 3.

STUDY ASSIGNMENT:

REFERENCES:

California Workbook and Testbook, Part 3, Cabinetmaking & Millwork

IMPORTANT STUDY FACTORS:

Instructor will use those tests that are relevant to his instructional situation.

WORK ASSIGNMENT:

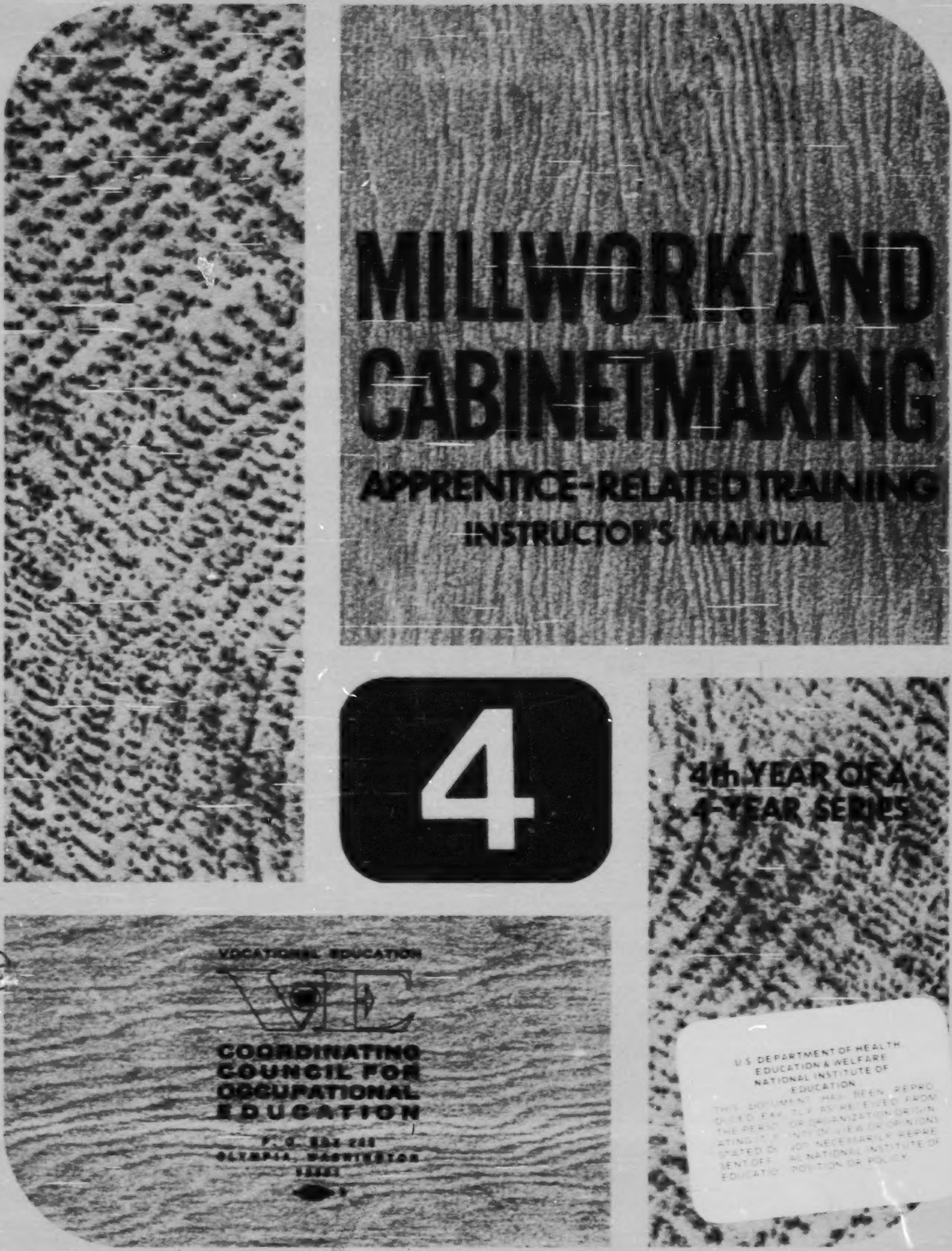
Number tests and list students' names on master sheet as you pass out tests.

After students complete tests, collect and pass out for review and grading.

INTRODUCTION TO NEXT LESSON:

Introduction to units to be covered in the fourth year.

ED 089019



MILLWORK AND CABINETMAKING

APPRENTICE-RELATED TRAINING
INSTRUCTOR'S MANUAL

4

4th YEAR OF A
4-YEAR SERIES

VOCATIONAL EDUCATION
VE
COORDINATING
COUNCIL FOR
OCCUPATIONAL
EDUCATION
P. O. BOX [illegible]
OLYMPIA, WASHINGTON
[illegible]

U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY.

CE 001 058 (d)

MAY, 1971
P 71-61

MILLWORK AND CABINETMAKING

INDEX

FOURTH YEAR - RELATED

UNIT	LESSON NO.	TOPIC	PAGE NO.
J	1 thru 12	Store fixtures and commercial detail work	10.01.01.01
	13 thru 17	Stairs	10.02.13.01
	18	Mantles	10.03.18.01
	19 thru 21	Test and review	10.04.19.01
K	22 thru 24	Take off from prints	11.01.22.01
	25 thru 27	Time and motion study	11.02.25.01
	28 thru 30	Costs and estimating	11.03.28.01
	31 thru 33	Special problems	11.04.31.01
	34 thru 36	Tests and review	11.05.34.01

UNIT J - TOPIC 1

Fourth Year Orientation

LESSON OBJECTIVE:

Class introduction and registration.

REFERENCES:

STUDY ASSIGNMENT:

Students fill out registration and list the following information for their personal introduction; to be handed in to the instructor at the end of the session.

Name
Social Security Number
Home address
Phone Number
Person to notify in emergency
Place student works
Work experience
Tools available in shop
Personal instructional needs

Students will introduce themselves in turn to the class and give a breakdown of the above information.

INTRODUCTION TO NEXT LESSON:

Store Fixtures
California Workbook, Part 3, Unit E, pp. 59-65.

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 1

Details - Commercial and Store Fixtures

LESSON OBJECTIVE:

To teach the apprentice the proper use of the necessary instruments and materials used in detail millwork drafting.

STUDY ASSIGNMENT:

Architectural Drawing for the Building Trades, pp. 1-7; 14-15.

REFERENCES:

Architectural Drawing for the Building Trades, Kenney and McGrail.

IMPORTANT STUDY FACTORS:

1. Learn the correct type of pencil to use. This is determined by the type of paper and purpose of the drawing.
2. Learn the correct method of sharpening a pencil.
3. Learn how to lay out the drawing paper.

WORK ASSIGNMENT:

1. What type of pencil is used for tracing?
2. What type of pencil is used for lettering?
3. Which end of the pencil should be sharpened? Why?
4. Why should a pencil be _______ after sharpening?
5. What is the object of the layout of the drawing paper?

INTRODUCTION TO NEXT LESSON:

Details - Note - Twelve 4-hour class sessions alloted to details and store fixtures.

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 1

Details for Commercial and Store Fixtures

LESSON OBJECTIVE:

To teach the apprentice proper lettering necessary for millwork detail drawing.

STUDY ASSIGNMENT:

Architectural Drawing for the Building Trades, pp. 14-17.

REFERENCES:

Architectural Drawing for the Building Trades, Kenney and McGrail.

IMPORTANT STUDY FACTORS:

1. Know why good lettering is required of a good draftsman.
2. Learn the most common style of lettering.
3. Be able to give the significance of guidelines.
4. Learn the rules for lettering.

WORK ASSIGNMENT:

1. ____________ are the first rules of lettering.
2. Vertical strokes are all made ____________.
3. Horizontal strokes are all made from ____________.
4. All round letters should be made as __________ as they are ____________.
5. Letters "M" and "W" are ______________ than they are tall.
6. Letters B, E, K, S, X, and Z should be _________ at the bottom than at top.
7. Most letters should be _______ narrower than they are tall.

INTRODUCTION TO NEXT LESSON:

Details for commercial and store fixtures.

UNIT J - TOPIC 1

Details for Commercial and Store Fixtures

LESSON OBJECTIVE:

To teach the apprentice how to select, use, and care for his drawing instruments.

STUDY ASSIGNMENT:

Architectural Drawing for the Building Trades, pp. 1-13.

REFERENCES:

Architectural Drawing for the Building Trades, Kenney and McGrail.

IMPORTANT STUDY FACTORS:

1. Learn what basic equipment is necessary.
2. Learn how to select the proper paper.
3. Be able to make and define the various lines required on a drawing.
4. Learn the correct way to use a T square and triangles.

WORK ASSIGNMENT:

1. Do not drive thumbtacks with a ______________.
2. Do not rule lines along the edge of a __________.
3. Do not draw with a _________ pencil.
4. Do not redraw a line __________.
5. Do not start work until you wipe off __________ and ____________.

INTRODUCTION TO NEXT LESSON:

Details

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 1

Details - Billing

LESSON OBJECTIVE:

To teach the apprentice how to dimension various objects and where the dimensions should be placed.

STUDY ASSIGNMENT:

Architectural Drawing for the Building Trades, pp 18-23.

REFERENCES:

Architectural Drawing for the Building Trades, Kenney and McGrail.

IMPORTANT STUDY FACTORS:

1. Remember that a geometric figure is the basis of all drawing.
2. Learn how to bisect a straight line.
3. Learn how to bisect an angle.
4. Learn how to divide a line into equal parts.
5. Learn how to draw a pentagon, hexagon, octagon, and ellipse.

WORK ASSIGNMENT:

Draw a geometric diagram.

INTRODUCTION TO NEXT LESSON:

Details

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 1

Details - Billing

LESSON OBJECTIVE:

To teach the apprentice how to make and understand the fundamentals of perspective, isometric, and oblique drawings.

STUDY ASSIGNMENT:

Architectural Drawing for the Building Trades, pp. 24-29.

REFERENCES:

Architectural Drawing for the Building Trades, Kenney and McGrail.

IMPORTANT STUDY FACTORS:

1. Learn which type of drawing is the most common.
2. Know which drawing must be made to scale.
3. Know when to use an isometric type drawing.
4. Become familiar with the type of drawing that should be used on irregular forms and intricate detail.

WORK ASSIGNMENT:

To be given in class.

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 1

Details - Billing

LESSON OBJECTIVE:

To teach the apprentice the basic principles and purpose of detail millwork drawings.

STUDY ASSIGNMENT:

Architectural Drawing for the Building Trades, pp. 30-31.

REFERENCES:

Architectural Drawing for the Building Trades, Kenney and McGrail.

IMPORTANT STUDY FACTORS:

1. Learn the purpose of shop detail drawings.
2. Learn the purpose of a floor plan.
3. Learn the purpose of an elevation.
4. Learn the purpose of a sectional view.
5. Learn the purpose of full size sections.

WORK ASSIGNMENT:

1. A floor plan is necessary to show the ____________ of the detail object in relationship to the rest of the room.
2. An ___________ shows what the object will look like (a picture).
3. A _________________ view shows how the object would look if it were cut in two parts.
4. _______________ section shows parts of the object in actual size.

INTRODUCTION TO NEXT LESSON:

Details

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 1

Detailing and Billing

LESSON OBJECTIVE:

To teach the apprentice how to detail and bill exterior trim.

STUDY ASSIGNMENT:

Architectural Drawing for the Building Trades, pp. 72-79.

REFERENCES:

Architectural Drawing for the Building Trades, Kenney and McGrail.

IMPORTANT STUDY FACTORS:

1. Learn the purpose of an outside cornice.
2. Study the preliminary steps in drawing a cornice.
3. Learn how to detail a cornice from a plan.
4. Learn how to draw a wall section showing a cornice.

WORK ASSIGNMENT:

1. Copy figures (Architectural drawing book) Numbers 60, 61, 62, 63 in the above Reference.

INTRODUCTION TO NEXT LESSON:

Details

UNIT J - TOPIC 1

Detailing and Billing

LESSON OBJECTIVE:

To teach the apprentice how to detail and bill a double hung window.

STUDY ASSIGNMENT:

Architectural Drawing for the Building Trades, pp. 58-59-60.

REFERENCES:

Architectural Drawing for the Building Trades, Kenney and McGrail.

IMPORTANT STUDY FACTORS:

1. Learn why windows are important to a house.
2. Study the steps necessary in drawing a head section.
3. Learn the steps necessary to draw a sill section.
4. Learn how to draw an elevation of a window.
5. The instructor will instruct the class on the proper method of billing.

WORK ASSIGNMENT:

The apprentice will be required to detail and bill a double hung frame as in Figure #55 (Architectural Drawing) for a stock 24" x 24" double hung window.

1. The net opening width of a frame 24" x 24" glass is ________________.
2. The net opening height of a frame for 24" x 24" glass is _______________;
3. A window stile is _________ wide, over the glass.
4. The bottom rail of a window is ____________ wide over the glass.
5. Stock parting bead is ____________ x ___________.
6. Stock blind stop is ___________ thick.
7. A stock jamb exclusive of casings is ____________ wide.

INTRODUCTION TO NEXT LESSON:

Details

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 1

Details for Cabinets

LESSON OBJECTIVE:

To teach the apprentice how to detail and bill in cabinets

STUDY ASSIGNMENT:

Cabinetmaking and Millwork, Dahl, Alf, & J. Douglas Wilson, pp. 61-62-64-73

REFERENCES:

Cabinetmaking and Millwork, Dahl, Alf, & J. Douglas Wilson

IMPORTANT STUDY FACTORS:

1. Show exactly how the cabinet joints are made.
2. Learn how to detail, sect, elevation floor plan.
3. Learn how to detail full size.

WORK ASSIGNMENT:

To be given by instructor

INTRODUCTION TO NEXT LESSON:

Store Fixtures

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 1

Store Fixtures

LESSON OBJECTIVE:

To help the apprentice find answers about store fixtures

STUDY ASSIGNMENT:

Cabinetmaking, Calif. Workbook #3, pp. 59-81

REFERENCES:

Cabinetmaking, Calif. Workbook #3

IMPORTANT STUDY FACTORS:

1. What types of fixtures are used in department stores, variety stores, and apparel stores?
2. How do stock fixtures differ from custom-built fixtures?
3. What materials are used in store fixture work?
4. What are the construction details of store fixtures?

WORK ASSIGNMENT:

1. Some cabinets and fixture plants __________ __________ __________ of merchandise.
2. Some plants limit their __________ to a __________ line.
3. When fixture leaves the __________ in __________ form--ready for delivery with __________ applied and with __________ fitted __________ (in some cases).

INTRODUCTION TO NEXT LESSON:

Store Fixtures

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 1

Store Fixtures

LESSON OBJECTIVE:

To teach the apprentice how to build and lay out fixtures

STUDY ASSIGNMENT:

Cabinetmaking, California Workbook #3, pp. 59-81

REFERENCES:

Cabinetmaking, California Workbook #3

IMPORTANT STUDY FACTORS:

1. Study the materials used in store fixtures.
2. Study the types of hardware.
3. Study the woods used in store fixtures; and commonly known hardwoods.

WORK ASSIGNMENT:

1. Fixtures to meet the storage and display needs of a retail store can be ____________ custom ____________ or obtained from the ____________ ______________ of ______________.
2. There are ______________ commonly-known hardwoods.
3. Name six commonly-known hardwoods.

INTRODUCTION TO NEXT LESSON:

Store Fixtures

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 1

Store Fixtures

LESSON OBJECTIVE:

To teach the apprentice the supplementary material of fixture work

STUDY ASSIGNMENT:

Cabinetmaking, California Workbook #3, pp. 59-81

REFERENCES:

Cabinetmaking, California Workbook #3

IMPORTANT STUDY FACTORS:

1. Wood is supplemented by other materials in the construction of many types of ____________ ____________.
2. The faces of fixtures are frequently faced with ________ ________ ____________.

WORK ASSIGNMENT:

To be made in class

INTRODUCTION TO NEXT LESSON:

UNIT J - TOPIC 2

Stairs

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of stair types

STUDY ASSIGNMENT:

Simplified Stair Layout, pp. 3-8

REFERENCES:

Simplified Stair Layout, by Wilson and Werner

IMPORTANT STUDY FACTORS:

Simplified Stair Layout

WORK ASSIGNMENT:

Straight and platform stairways
Rough stairways
Closed stairways
Open stairways

INTRODUCTION TO NEXT LESSON:

Stairway Construction

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 2

Stairs

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of stairway construction

STUDY ASSIGNMENT:

Simplified Stair Layout, pp. 8, 9, 10

REFERENCES:

Simplified Stair Layout, by Wilson and Werner

IMPORTANT STUDY FACTORS:

Stairway construction

WORK ASSIGNMENT:

Stair horses -- types

Stair stringers -- types

INTRODUCTION TO NEXT LESSON:

Stairway, Mathematical and Layout Terms

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 2

Stairs

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of mathematical and layout terms

STUDY ASSIGNMENT:

Simplified Stair Layout, pp. 12-14

REFERENCES:

Simplified Stair Layout, Wilson and Werner

IMPORTANT STUDY FACTORS:

Stairway--Mathematical and layout terms

Stairway--Parts

WORK ASSIGNMENT:

Layout

Stairway--Parts

INTRODUCTION TO NEXT LESSON:

Mathematical Calculations

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 2

Stairs

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of mathematical calculations

STUDY ASSIGNMENT:

Simplified Stair Layout, pp. 19-30

REFERENCES:

Simplified Stair Layout by Wilson and Werner

IMPORTANT STUDY FACTORS:

Mathematical Calculations

WORK ASSIGNMENT:

How to find the total rise of a stairway
How to lay out a stair rod
How to determine the tread rise of a stairway
How to determine the tread run of a stairway

INTRODUCTION TO NEXT LESSON:

Layout procedures of stairs

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 2

Stairs

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of layout procedures

STUDY ASSIGNMENT:

Simplified Stair Layout, pp. 33-50

REFERENCES:

Simplified Stair Layout, Wilson and Werner

IMPORTANT STUDY FACTORS:

Layout Procedures

WORK ASSIGNMENT:

How to lay out a sawed-out stairhorse with the steel square
How to lay out a built-up stairhorse
How to lay out a platform stairway

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 3

Mantels

LESSON OBJECTIVE:

To provide the apprentice with the knowledge required to cut and make the various kinds of mantels

STUDY ASSIGNMENT:

Architectural Woodwork Design, pp. 78-93

REFERENCES:

Architectural Woodwork Design, pp. 78-93

IMPORTANT STUDY FACTORS:

1. Learn the various types of mantels.
2. Learn all you can about the construction of the mantels.
3. Be able to lay out, make material, bill, and machine mantels.

WORK ASSIGNMENT:

1. Make a drawing of at least two types of mantels.
2. Make a cutting bill for one mantel.

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 4

Tests on Store Fixtures, Stairs, and Mantels

LESSON OBJECTIVE:

To determine how much the apprentice has learned from the above

STUDY ASSIGNMENT:

REFERENCES:

California Workbook and Testbook, Part 3, Simplified Stair Layout, by J. Douglas Wilson and S. O. Werner

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Pass out tests. (Number tests instead of having students put name on same. List students' names on master numbered sheet.)

INTRODUCTION TO NEXT LESSON:

Grading and review on completed tests.

CABINETMAKING AND MILLWORK

UNIT J - TOPIC 4

Test and Review

LESSON OBJECTIVE:

To grade and evaluate the former lesson tests

STUDY ASSIGNMENT:

REFERENCES:

California Workbook and Testbook, Part 3, Simplified Stair Layout, by J. Douglas Wilson and S. O. Werner

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Call on students in rotation to answer questions on tests. Use the master test sheet to be sure no student has his own test.

INTRODUCTION TO NEXT LESSON:

Take Off From Prints, United Brotherhood Plans, A.B.C.

UNIT K - TOPIC 1

Take off from prints. U. B. of C. Plan A

LESSON OBJECTIVE:

To familiarize the apprentice with the basic millwork in a small home.

REFERENCES:

STUDY ASSIGNMENT:

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

List the following on a takeoff sheet in preparation for pricing doors, windows, and frames, running and standing trim, stair material, mantles, cabinets, and vanities, plus any other indicated detail woodwork. Be sure to make a list of inclusions and exclusions.

INTRODUCTION TO NEXT LESSON:

Topic - Take off from prints.

Material - U. B. of C. Plan B.

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 1

Millwork Field and Sequence of Work Delivery to Job Site

LESSON OBJECTIVE:

To acquaint the apprentice with the scope of millwork and the proper sequence of delivery to job site.

STUDY ASSIGNMENT:

Study thoroughly Information Sheet

REFERENCES:

Information Sheet

IMPORTANT STUDY FACTORS:

1. Learn the definition of millwork.
2. Be able to describe the difference between detail millwork and stock millwork.
3. Learn the sequence of delivery to the job site.

WORK ASSIGNMENT: (Complete the following statements.)

1. ____________________ lumber is not considered a part of millwork.
2. Stock millwork is generally built by ______________ ______________ methods.
3. Detail millwork is ____________ built to the architect's details.
4. The first items of millwork needed on the job are the __________ frames.
5. Before any interior trim is delivered to the job all __________ and ________________ must have been delivered and set in place.
6. The last regular delivery to the job site would probably include cabinet ____________________ and ____________________.

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 1 INFORMATION SHEET

Millwork:

All finished wood materials that go into a house or building are considered millwork, except dimension lumber, lathing, shingles or shakes.

General classifications:

Detail Millwork: Is custom built to architect's details for one house at a time. Detail millwork covers the whole scope of millwork, but each item is detailed and manufactured to a special pattern or size that is not found in a stock millwork catalog.

Stock Millwork: Is made in the same manner as detail millwork, but by specialized factories producing particular items made to a standard detail or pattern in large quantities, generally by production line methods. Items commonly known as stock millwork that can be purchased at any lumberyard are moldings, trim (in a few standard designs), frames (to a few standard details), sash in large quantities, doors in standard sizes and design, etc.

Sequence of work delivery to job site:

Millwork is needed by the builder at definite intervals and the mill shop must know when it should be ready for delivery. The proper delivery of millwork is very important and therefore, it is necessary to know just which items will be needed first.

The delivery schedule should be as follows:

a. Basement frames.
b. Cornice, including wood gutters, soffits, fascia, crown and bed molds, and rake mold if required.
c. Exterior window and door frames.
d. Any finished woodwork that must be installed before the exterior wall finish can be applied. This includes such items as brackets, porch posts, corner beads, pilasters, louvers, vents, etc.
e. Sash and windows.
f. Inside door frames, especially if dry wall plaster is used.
g. Interior and exterior doors.
h. All interior trim.
i. Cabinet work.
j. Mantel, if required
k. Stairs, if required.
l. Miscellaneous cabinet work and trim, consisting of such items as:
    (1) closet poles and shelves
    (2) medicine cabinets
    (3) telephone niche
    (4) any other odd items that might have been omitted or have to be replaced
m. Cabinet doors and drawers are frequently left for the last delivery.

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 1

Millwork Operations: Preparation of Millwork for Delivery to Job Site

LESSON OBJECTIVE:

To provide the apprentice with necessary information so that he may adequately prepare millwork for shipment to arrive at the job site undamaged.

STUDY ASSIGNMENT:

Read complete Information Sheet

REFERENCES:

Information Sheet

IMPORTANT STUDY FACTORS:

1. Learn the necessary precautions to take for both long and short hauls of cabinet work.
2. Learn how to crate sash and doors.
3. Learn how to bundle moldings.
4. Learn how to brace frames.
5. Learn how shelving and lineal lumber should be handled.

WORK ASSIGNMENT:

1. Cabinet work should be ____________________ for long hauls and should always be provided with ____________________ for even the shortest hauls.
2. Sash should have the glass fully ____________________ for long hauls, but need only have ____________________ for short hauls.
3. Doors should be completely ____________________ for long hauls and should always have ____________________ on the end of the stiles for short hauls.
4. Moldings should always be ____________________ and ________________ for long hauls.

UNIT K - TOPIC 1

Preparation of Millwork for Delivery to Job Site (continued)

WORK ASSIGNMENT: (cont'd.)

5. Shelving should always be bundled with the ________________ side in.
6. Hardware should be tightly ____________________ for long shipments.

INTRODUCTION TO NEXT LESSON:

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 1 INFORMATION SHEET

Millwork Operations - Preparation of Millwork for Delivery to Job Site

The very finest of millwork will be ruined in delivery to the job site unless proper precautions are taken. These precautions vary with the size of the article and the distance to the job site.

Preparation for long hauls or shipment by freight:

1. All mill and cabinet work to be shipped by freight or hauled a great distance by truck should be thoroughly wrapped with a tough paper and crated.

2. Cabinets should be wrapped with a good grade of craft paper and then suspended in a crate in such a manner that the crate cannot rub the cabinet. The slats should be closely spaced and of sufficient strength to prevent other objects from coming in contact with the cabinet if the crates are stacked. Crates must not be too heavy or bulky, and corners should be lapped and nailed in such a manner that the slats will not be torn off in transit.

3. Sash of the same size should be stacked in four or six pairs to a bundle and cleated with two cleats on each edge. Both face sides should be completely covered with 5/16" crating to protect the glass.

4. Doors should be crated in lots of three or four to a crate and thoroughly wrapped with paper. The crate should have enough slats to carry the weight of the doors as well as to protect them in shipping. Doors could also be wrapped in cardboard and banded with flat metal bands.

5. Moldings should be grouped in uniform lengths as much as possible, and thoroughly wrapped with paper and tied with strong cord or banded with flat metal bands.

6. Frames should be shipped knocked down with like members wrapped and tied with cord or banded with flat metal bands.

7. Shelving and lineal lumber can be shipped by bundling with cord or flat metal bands. Care should be taken to always keep the face side of the shelves or lumber to the inside of the bundle. Scratches on the back side will not be noticeable.

8. Hardware should always be crated in a tight box of light weight.

Preparation for short hauls:

For short hauls, the most important thing is to sufficiently protect the millwork so that moving or sliding will not cause damage or split corners and edges.

1. Cabinets should always be provided with bottom skids. These skids run full length and have beveled ends so they will act as runners for sliding the cabinet without damage. All drawers and doors should be held closed with a narrow strip of scrap plywood bradded to the stiles.
2. Sash should always be cleated together to save time in handling, but need not be crated.
3. Doors should always have a short shoe nailed on the bottom of each stile so if slid on the floor, ends of the stiles will not be damaged.
4. Moldings should be tied in convenient bundles with cardboard or paper under the cord or flat metal bands to prevent damage to the moldings.
5. Frames should always have at least one corner braced before delivery to the job. This brace should be long enough to prevent wracking.
6. Shelving and lineal lumber should be bound in bundles of convenient size with cord or flat metal bindings. Care should always be taken to keep the face sides to the inside of the bundle.
7. Hardware need only be wrapped or boxed enough to prevent spilling or loss for short hauls.

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 1

Take Off from Prints

LESSON OBJECTIVE:

To teach the apprentice to list and price the millwork shown on Plan B.

STUDY ASSIGNMENT:

REFERENCES:

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Follow the same procedure from Lesson 11.01.21.01

MATERIAL:

U. B. of C., Plan B

INTRODUCTION TO NEXT LESSON:

Topic - Take off from Prints
Material - U. B. of C., Plan C

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 1

Take Off From Prints

LESSON OBJECTIVE:

To teach the apprentice to list and price millwork on Plan C

STUDY ASSIGNMENT:

REFERENCES:

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Follow the same procedure as outlined on Lesson 11.01.22.

MATERIAL:

U. B. of C., Plan C

INTRODUCTION TO NEXT LESSON:

Topic - Time and motion Study

Material - Inform each apprentice to bring tape rule and a combination square the next lesson.

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 2

Time and Motion Study

LESSON OBJECTIVE:

To teach the apprentice to lay out the cabinet on detail 11.02.2504

STUDY ASSIGNMENT:

REFERENCES:

WORK ASSIGNMENT:

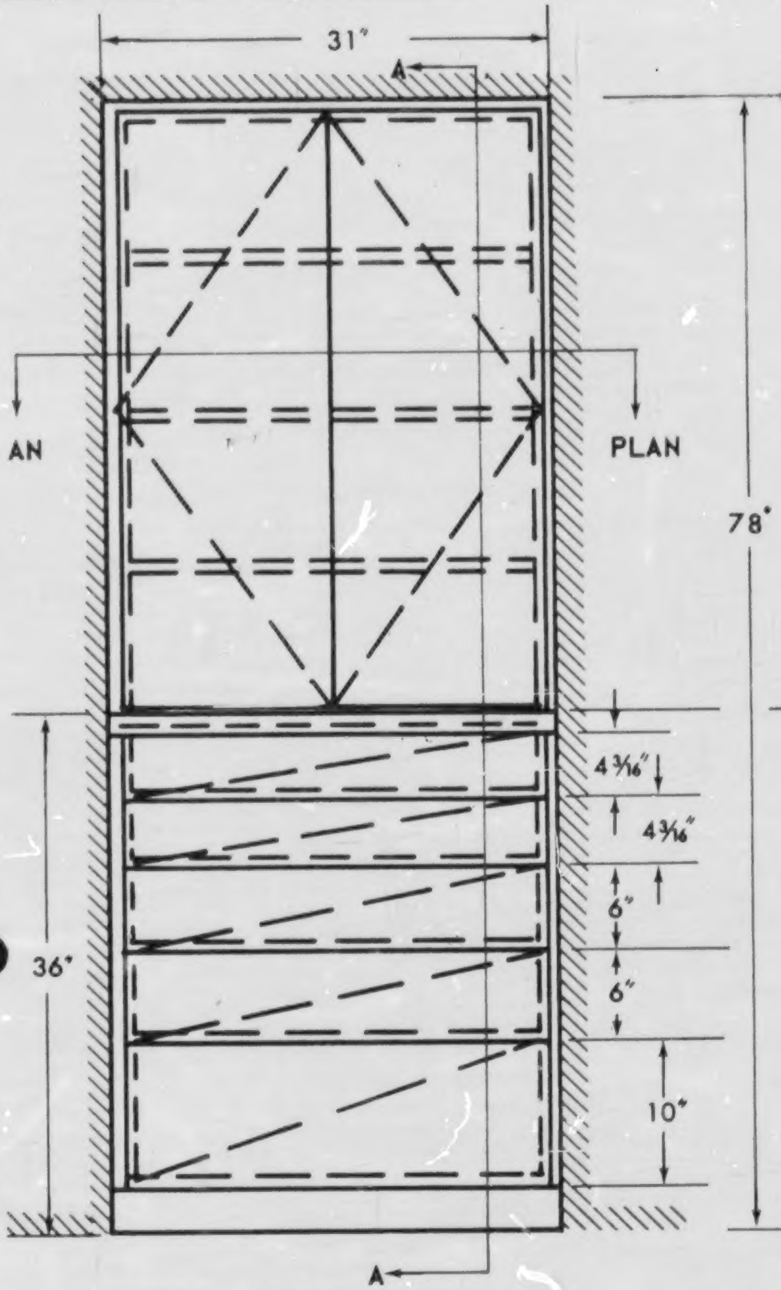
Pass out details and layout boards. Pair the apprentices to work together. Proceed through the layout procedure step by step, making sure each board is done properly; explaining various ways it can be done and analyzing each method in turn. Have them plan to build 125 of these units.

MATERIAL:

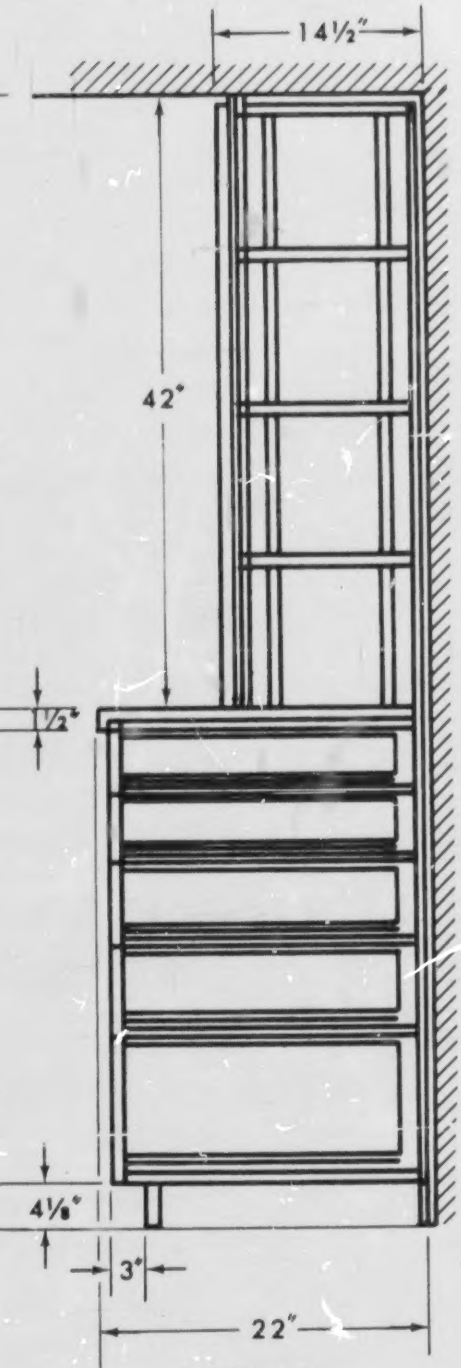
Tape rule, combination square, layout board approx. 3/8" to 3/4" x 4 1/2" x 96"

INTRODUCTION TO NEXT LESSON:

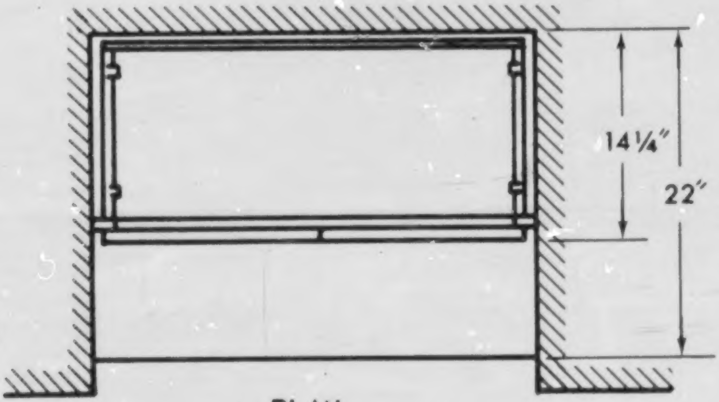
Topic - Time and Motion Study, Billing


31"
A
AN
PLAN
78"
4 3/16"
4 3/16"
6"
6"
10"
36"
A

ELEVATION


14½"
42"
½"
4⅛"
3"
22"

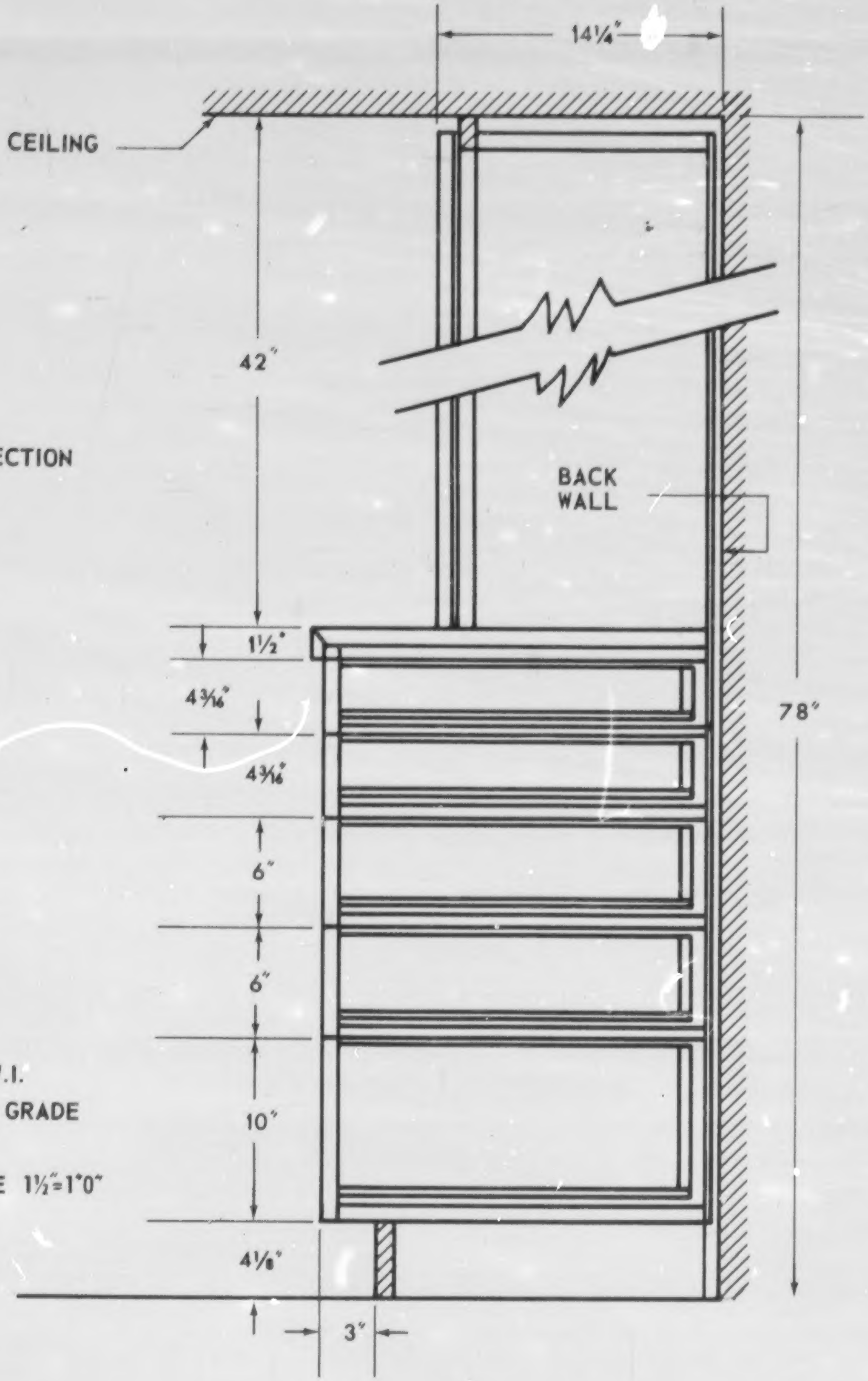
SECTION



PLAN

ALL EXPOSED MATERIAL
NATURAL BIRCH
PIN HINGES
HARDWOOD CENTER GUIDE
RUBBER BASE

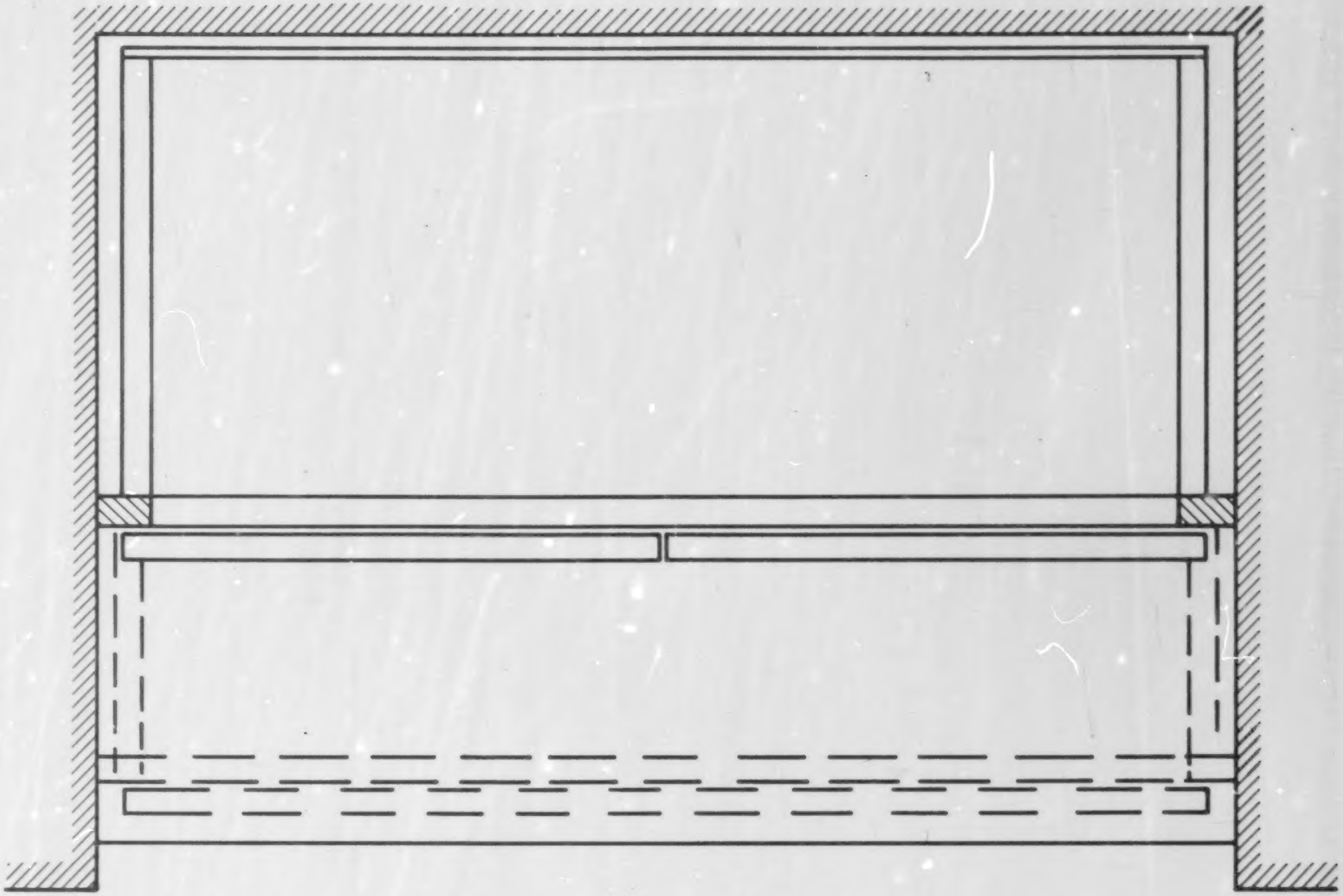
SCALE ¾=1" 0"


14¼"
CEILING
42"
BACK WALL
78"
1½"
4 3/16"
4 3/16"
6"
6"
10"
4⅛"
3"

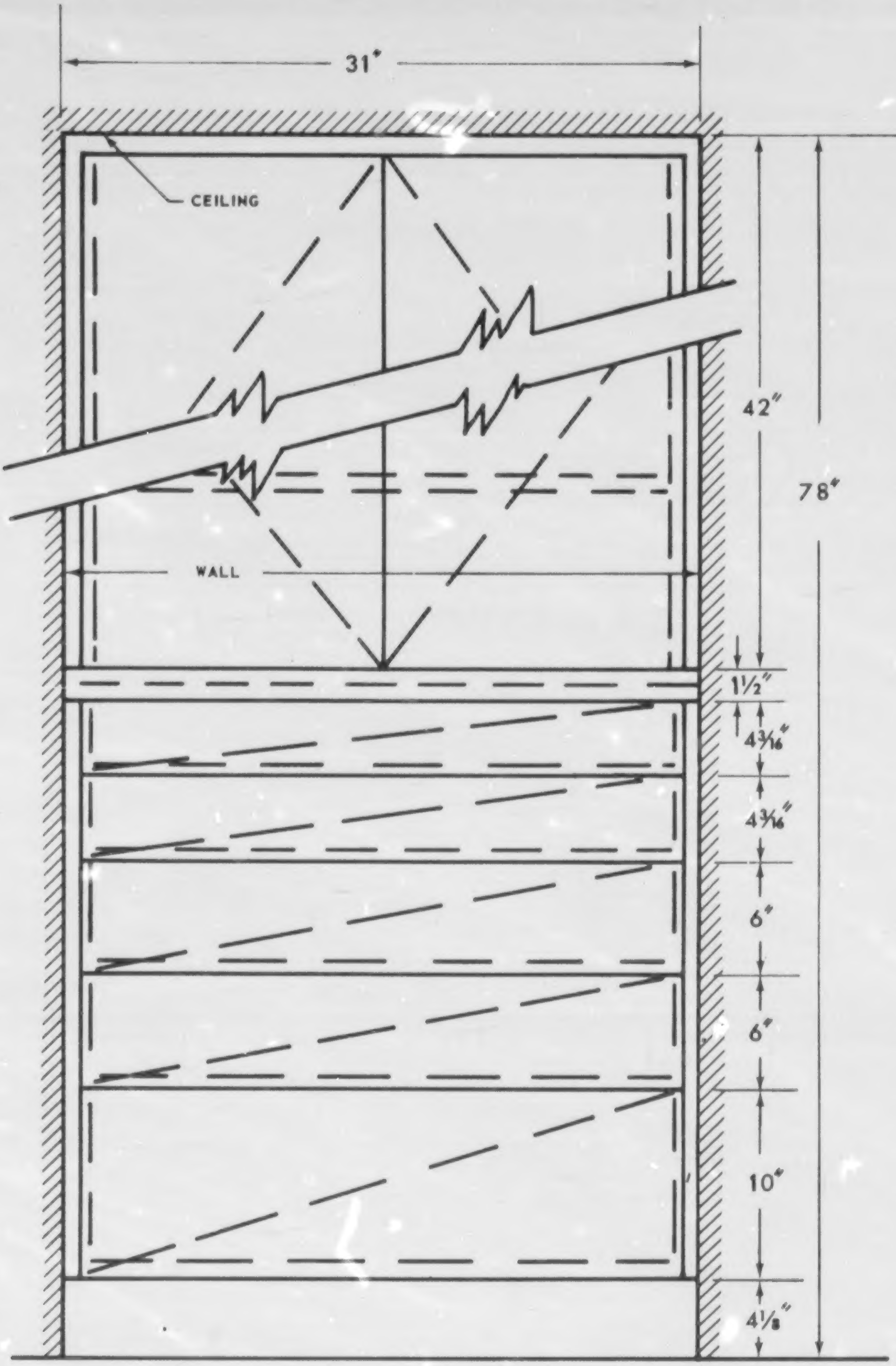
SECTION

A.W.I.
CUSTOM GRADE

SCALE 1½"=1'0"



PLAN


31"
CEILING
WALL
42"
78"
1½"
4³⁄₁₆"
4³⁄₁₆"
6"
6"
10"
4⅛"

A.W.I.
CUSTOM
GRADE

ELEVATION

SCALE 1½"=1'0"

UNIT K - TOPIC 2 INFORMATION SHEET

MILLWORK OPERATIONS

JOB PLANNING

Foreword:

Job planning is one of the most important functions any tradesman is required to perform. Regardless of how good a mechanic the workman is, if he cannot lay out his work in an orderly manner and follow a sequence that will not cause repetition of setups and loss of time, he will never reach the top of his profession.

It is therefore very important that the apprentice devote considerable time and study to the proper technique of job planning or the laying out of his work in advance of starting a job.

Detailing:

The first step in a well planned job is to make the details. Sometimes this can be the simplest of sketches, other jobs require an elaborate detail, but in any event it must be sufficient to convey the thought or mental picture of the job to be done to others, as well as retain this thought or mental picture for the originator.

Billing:

The second step of a well planned job is the billing of the material. This is a complete lesson in itself, and is taken up at another time in this course, but is a very important step.

Stock cutting:

The third step of a well planned job is the stock cutting. This also is a complete lesson and will be taken up in a following assignment.

Gluing:

After the stock is cut all material that must be glued up in wider widths or greater thicknesses should be glued so it will be ready to dress and size with the rest of the materials.

Sticker work, morticing and tenoning:

Any materials that must be run through the sticker should be stuck at this time and all morticing and tenoning should be done so the bench men can have all face frames, drawer frames, etc. glued in time to be sanded and ready for the final assembly by the time the rest of the material is ready.

Planing:

Any materials that must be dressed to special thicknesses should be taken to the planer and dressed as required.

Trimming:

The material should then be moved to the trim saw. Everything, including drawer frames, should be ripped to net width and cut to net length, then any grains, plows, rabbets or miters that are required should be made. In fact, everything with the exception of drawers and doors, if any, is machined ready for the final assembly.

Sanding:

All materials that require sanding should then go to the belt sander or drum sander as the case may be, and be sanded.

Final assembly:

After the materials are properly sanded they go to the benchmen for final assembly.

Machining of drawers and doors:

Inasmuch as the drawers and doors are the last materials needed by the benchmen, they are machined out by the trim saw man while the rest of the materials are being sanded and assembled.

Finally: If this schedule of job planning is followed, the work will flow through the shop in an uninterrupted stream with no back tracking or waiting for materials.

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 2

Time and Motion Study

LESSON OBJECTIVE:

To teach the apprentice to bill in 125 of these units using his layout board

STUDY ASSIGNMENT:

REFERENCES:

IMPORTANT STUDY FACTORS:

Every piece needed for these units must be ordered at this time. Many machining methods will have to be planed at this time.

WORK ASSIGNMENT:

Bill in all material for 125 units on Detail 11.02.25
On scratch paper note machining methods and operations each apprentice will have to use in his own shop to achieve the objective and what alternatives he may use.

MATERIALS:

As required for Lesson 11.02.24 plus scratch paper for billing.

INTRODUCTION TO NEXT LESSON:

Topic - Time and Motion Study
        Machining and Assembly on a Production Basis

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 2

Time and Motion Study

LESSON OBJECTIVE:

To teach the apprentice to consider all factors in the machining and assembly of these units

STUDY ASSIGNMENT:

REFERENCES:

IMPORTANT STUDY FACTORS:

Proper sequences
Proper use of space
Importance of programming

WORK ASSIGNMENT:

Have each apprentice list on scratch paper the steps of machining and assembly he would use to produce this job.

Have students exchange papers and go through their steps and analyze them in turn. Have the apprentices discuss and solve these steps. Involve them.

MATERIAL:

All material required for Lessons 11.02.24. and 11.02.25 plus samples

INTRODUCTION TO NEXT LESSON:

Topic - Cost and Estimating
Material - Unit 12 U. B. of C. Blue Print Reading and Estimating

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 3

Costs and Estimating

LESSON OBJECTIVE:

To teach the apprentice the proper use of the necessary labor in each job

STUDY ASSIGNMENT:

Unit 12 (Part I) Blueprint Reading and Estimating
United Brotherhood of Carpenters and Joiners of America

REFERENCES:

Unit 12 (Part I) Blueprint Reading and Estimating
United Brotherhood of Carpenters and Joiners of America

IMPORTANT STUDY FACTORS:

Study Unit 12 (Part I) Blueprint Reading and Estimating

MATERIAL:

Unit 12, U. B. of C., Blueprint Reading and Estimating

INTRODUCTION TO NEXT LESSON:

Note: three 4-hour class sessions allotted to costs and estimating.
Topic - Costs and Estimating.

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 3

Costs and Estimating

LESSON OBJECTIVE:

To teach the apprentice the proper use of the necessary costs of material

STUDY ASSIGNMENT:

Unit 12 (part II) Blueprint Reading and Estimating
United Brotherhood of Carpenters and Joiners of America

REFERENCES:

Unit 12 (part II) Blueprint Reading and Estimating
United Brotherhood of Carpenters and Joiners of America

IMPORTANT STUDY FACTORS:

Study Unit 12 (part II) Blueprint Reading and Estimating

WORK ASSIGNMENT:

To be made in class

MATERIAL:

Unit 12, Blueprint Reading and Estimating, U. B. of C.

INTRODUCTION TO NEXT LESSON:

Topic - Costs and Estimating
Material - Unit 12, U. B. of C. Blueprint Reading and Estimating

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 3

Costs and Estimating

LESSON OBJECTIVE:

To teach the apprentice the proper use of labor and material in estimating a job

STUDY ASSIGNMENT:

Unit 12 (Part II) Blueprint Reading and Estimating
United Brotherhood of Carpenters and Joiners of America

REFERENCES:

Unit 12 (Part II) Blueprint Reading and Estimating
United Brotherhood of Carpenters and Joiners of America

IMPORTANT STUDY FACTORS:

Study Unit 12 (Part II) Blueprint Reading and Estimating

WORK ASSIGNMENT:

To be made in class

MATERIAL:

Unit 12, Blueprint Reading and Estimating
United Brotherhood of Carpenters and Joiners of America

INTRODUCTION TO NEXT LESSON:

Topic - Special Problems
Material - Unit VIII U. B. of C, Cabinetmaking (Mill)

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 4

Special Problems

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of special problems in paneling

STUDY ASSIGNMENT:

Cabinetmaking (Mill) United Brotherhood, pp. 52-53

REFERENCES:

Cabinetmaking (Mill) United Brotherhood of Carpenters and Joiners of America

IMPORTANT STUDY FACTORS:

Cabinetmaking (Mill) United Brotherhood of Carpenters and Joiners of America, pp. 52-53

WORK ASSIGNMENT:

1. What are the three general classifications of wall paneling?
2. What woods are commonly used for wall paneling?
3. What variations in finish are found among the types of wall paneling?
4. How are the various types of wall paneling installed?

MATERIALS:

Unit VIII, U. B. of C. Cabinetmaking (Mill)

INTRODUCTION TO NEXT LESSON:

Topic - Special Problems
Material - Manual of Millwork, Woodworking Institute of California

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 4

Special Problems

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of special problems in paneling

STUDY ASSIGNMENT:

Manual of Millwork, Woodwork Institute of California, p. 36

REFERENCES:

Manual of Millwork, Woodwork Institute of California, p. 36

IMPORTANT STUDY FACTORS:

Manual of Millwork, Woodwork Institute of California, p. 36

WORK ASSIGNMENT:

Study manufacturers' brochures that are distributed by lumber dealers and that illustrate the many different types of wall panelings.

MATERIALS:

Manual of Millwork, Woodwork Institute of California

INTRODUCTION TO NEXT LESSON:

Topic - Special Problems
Material - Apprentice bring his own project

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 4

Special Problems - Apprentice's Personal Project

LESSON OBJECTIVE:

To provide the apprentice with a working knowledge of special problems he may have in the shop where he works

STUDY ASSIGNMENT:

Apprentice's own project

REFERENCES:

Apprentice's own project

IMPORTANT STUDY FACTORS:

Classroom projects

WORK ASSIGNMENT:

Classroom projects

MATERIAL:

Apprentice's personal project

INTRODUCTION TO NEXT LESSON:

Topic - Tests and Review
Material - Detail of nightstand, tape rule, combination square, layout board

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 5

Tests and Review

LESSON OBJECTIVE:

To test the apprentice on what he knows about layout and billing

STUDY ASSIGNMENT:

REFERENCES:

IMPORTANT STUDY FACTORS:

Stress the importance of the layout board as a full-sized detail. Everything must show.

WORK ASSIGNMENT:

Have each apprentice complete his layout board and bill in the material required for 15 units.

MATERIAL:

Detail of small nightstand with drawer and door: tape, combination square, layout board.

INTRODUCTION TO NEXT LESSON:

Topic - Test on Machining and Assembly of the Nightstands
Material - As needed for 11.05.33.01

UNIT K - TOPIC 5

Tests and Review

LESSON OBJECTIVE:

To have each apprentice show the procedure he would use to produce those 15 nightstands. Have him estimate time and material.

STUDY ASSIGNMENT:

REFERENCES:

IMPORTANT STUDY FACTORS:

Neatness and legibility a must for the entire operation

WORK ASSIGNMENT:

Each apprentice shall:

List his procedure
Estimate all time for job
List and price material cost for job plus markup
Add all essential extras
Quote his price for job

MATERIAL:

All material required for Lesson 11.05.34 plus scratch paper

INTRODUCTION TO NEXT LESSON:

Topic - Tests and Review
Material - U. B. of C. Final Test

UNIT K - TOPIC 5

Tests and Review

LESSON OBJECTIVE:

To test the apprentice on what he knows

STUDY ASSIGNMENT:

REFERENCES:

IMPORTANT STUDY FACTORS:

Use the numbered master sheet to pass out the tests. Number each test. Place apprentice's name on master sheet.

WORK ASSIGNMENT:

Have the apprentices fill out tests in 4-hours' time.

MATERIAL:

U. B. of C. Final Test for Unit IX or Alternate Final Test for Unit VIII.

INTRODUCTION TO NEXT LESSON:

Topic - Tests and Review

Grade and Review Test on 11.05.35.01

CABINETMAKING AND MILLWORK

UNIT K - TOPIC 5

Tests and Review

LESSON OBJECTIVE:

To correct and review the test that was taken in previous lesson

STUDY ASSIGNMENT:

REFERENCES:

IMPORTANT STUDY FACTORS:

WORK ASSIGNMENT:

Pass out tests making certain from master sheet they are well circulated.
Have apprentices in turn answer and review each question.
Upon completion the instructor will have them collected for grading.

MATERIAL:

U. B. of C. Final test for Unit IX or alternate final test for Unit VIII.

INTRODUCTION TO NEXT LESSON:

Wish them a happy summer vacation and pass on information on graduation.